Semester VII

Sr. No.	Code No.	Subject	Semester	Credits
1	PCC-ETC701	Satellite Communication	7	4
2	PCC-ETC702	Embedded Systems	7	5
3	PCC-ETC703	Computer Networks	7	5
4	PCC-ETC704	Image Processing	7	5
5	PCE-ETC701	Elective-I	7	4
6	PW-ETC701	Project Phase-I	7	2
Total				**25**

Semester VIII

Sr. No.	Code No.	Subject	Semester	Credits
1	PCC-ETC801	Microwave Engineering	8	5
2	PCC-ETC802	Wireless Communication	8	5
3	PCC-ETC803	Video Engineering	8	5
4	PCE-ETC801	Elective-II	8	4
5	PW-ETC801	Project Phase-II	8	6
Total				**25**

Elective-I	Elective-II
Speech Processing	High Performance Communication Network
Radar and Navigation	Advance Network Security
Java Script	Electrical Automobile
Information Theory And Coding Techniques	Big Data Analytics

*****For Theory CIE 30 Marks,**

Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.

*****Guidelines to paper setter:**

In theory ESE examination of 70 marks following pointes should be considered,

1. First question of 10 marks should be allotted to Objective type questions.
2. In Remaining 60 marks, four questions of 15 marks should be considered.

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: SATELLITE COMMUNICATION

Course Details

Class	**Final Year B.Tech. Sem-VII**
Course Code and Course Title	**PCC-ETC701: Satellite Communication**
Prerequisites	**Analog Communication & Digital Communication**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Objectives: The course aims to :	
1	To introduce the fundamental concept in the field of satellite communication.
2	To provide understanding of satellite communication system operation, launching Techniques.
3	To analyse, design and evaluate satellite communication subsystem.
4	To examine concept of satellite networking.
5	To outline applications of Satellite Systems in various fields

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Understand Orbital aspects involved in satellite communication.
2	Understand various subsystems in satellite communication system
3	Explain and Analyse Link budget calculation.
4	Understand Satellite Network System
5	Explain Non Geostationary Satellite Systems
6	Explain different applications of Satellite Systems

COURSE CONTENTS		
Unit No.1	**INTRODUCTION OF SATELLITE COMMUNICATION:** Introduction, basic concept of satellite communication, Orbital Mechanics, Look angle determination, Orbital perturbation, Orbital determination Launchers and Launch vehicles, Orbital effects in communication system performance.	**7 Hrs.**
Unit No.2	**SATELLITE SUBSYSTEM:** Introduction, Attitude and control system(AOCS), Telemetry, Tracking, Command and Monitoring, Power systems, Communication subsystem, Satellite antennas, Equipment reliability and space qualification.	**7 Hrs.**
Unit No.3	**SATELLITE LINK DESIGN:** Introduction, Basic transmission Theory, System Noise Temperature and G/T Ration, Design of Downlinks, Uplink Design, Design of specified C/N : Combining C/N and C/I values in Satellite Links. **(Numerical Expected)**	**6 Hrs.**
Unit No.4	**SATELLITE NETWORKS**: Reference architecture for satellite networks, basic characteristics of satellite networks, Onboard connectivity with transparent processing, analogue transparent switching, Frame organization, Window organization, On board connectivity with beam scanning.	**6 Hrs.**
Unit No.5	**LOW EARTH ORBIT AND NON GEO-STATIONARY SATELLITE SYSTEM:** Introduction, Orbit considerations, Coverage and Frequency Consideration, Delay and Throughput Consideration, Operational NGSO constellation design: Iridium, Teledesic.	**4 Hrs.**
Unit No.6	**SATELLITE APPLICATIONS:** Communication Satellite-Digital DBS TV, Satellite Radio Broadcasting, Navigation Satellite, GPS Position Location Principles, GPS Receivers and codes. Military Satellite- Directed Energy Laser Weapons, Weather Forecasting Satellite Application	**6 Hrs.**

TEXT BOOKS:

1	Satellite Communications-Timothy Pratt, Charles Bostian, Jeremy Allnut John Wiley &Sons (II Edition) (For Unit 1,2,3,5)
2	Satellite Communications-Anil k. Maine and VarshaAgaraval, Wiley Publications (All Units)
3	Satellite Technology Principles and ApplicationsAnil K. Maini and VarshaAgarawal, Wiley Publications, Third Edition (Unit 6)

REFERENCE BOOKS:

1	Satellite Communications- Dennis Roody McGraw Hill Fourth Edition (All Units)
2	Satellite Communications- Gerard Maral and Michel Bousquet, Wiley Publication (5^{th}Edition For Unit 4)
3	Satellite Communications systems Engineering, 2nd edition- Wilbur L. Pritchard, Henri G.Suyderhoud and Robert A. Nelson. (Unit I)

NOTE:

1. **Students, as a part of their term work, should visit satellite earth station and submit a report of visit.**
2. **Minimum 8 tutorials / assignment based on above syllabus**.

Note for question paper setter: 64 marks theory + 6 marks problem.

GUIDELINES TO PAPER SETTER:

In theory ESE examination of 70 marks following points should be considered:

Q.1 MCQ's based on complete syllabus. (Carries14 Marks)
Q.2 based on unit no 1, 2, 3 (Carries 14 Marks)
Q.3 based on unit no 1, 2, 3 (Carries 14 Marks)
Q.4 based on unit no 4, 5, 6 (Carries 14 Marks)
Q.5 based on unit no 4, 5, 6 (Carries 14 Marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: PROJECT PHASE-I

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PW-ETC701 : Project Phase-I**
Prerequisites	
Teaching scheme: Lectures + Practical	**0 Hrs. + 4 Hrs.**
Credits	**0 + 2**
Evaluation Scheme ESE + CIE for Theory	**-**

Teaching scheme	**Examination scheme**
Practical: 4 Hrs. /Week	**-**
-	**TW: 25 Marks OE: 50 Marks**

Course Objectives: The course aims to :	
1	Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation
2	Encourage multidisciplinary research through the integration learned in a number of courses.
3	Provide a student the opportunities to apply and integrate his/her knowledge acquired throughout the undergraduate study.

Course Outcomes: After the completion of the course the student should be able to:	
1	Identify the problem statement through literature survey for project work.
2	Develop design strategy for the project work.
3	Develop presentation and interpersonal communication skills through project work.
4	Develop the ability to learn independently and to find/integrate information from different sources required in solving real-life problems.
5	enhance technical report writing skills with proper organization of materials;

1. The project is to be carried out in two semester of Final Year B. Tech (Electronics and Tele communications) Part-I and Part-II.
2. The practical batch size for project will be of 15 students. The project batch will be preferably divided into groups each consisting of not more than 3 students.
3. In semester I, group will select a project with the approval of guide and submit the synopsis of project in the first month of Semester I. The group is expected to complete detail system design, layout etc. in semester I, as a part of the term work in the form of joint report.
4. In addition all students of project groups will deliver the seminar on the proposed project only.
5. Hardcopy of project diary should be maintained Group wise, where report of every week activity should be maintained. This should be presented at the time of examination.
6. Winter/Summer Internship/Industrial Training report should be submitted along with Seminar report on Project-I and evaluation of the same will be carried out in Final year Project Phase-I as internal assessment and marks should considered in term work by respective Guide
7. Guide of the project batch should take presentation on report of Project Phase –I along with Winter/Summer Internship/Industrial Training report. They should consider marks of the same in term work of project phase-I. and give marks out of 50.

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: WIRELESS COMMUNICATION

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PCC-ETC 802: Wireless Communication**
Prerequisites	**Communication**
Teaching scheme : Lectures +Practical	**4 Hrs. + 2 Hrs.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) +30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) + 30 (CIE)**
Practical: 2 Hrs./Week	**TW: 25 Marks**

Course Objectives: The course aim is to :	
1	Focus on basic fundamentals of wireless communication.
2	Explain large & small scale radio wave propagation
3	Understand basic wireless technology
4	Understand various wireless protocols

Course Outcomes: Upon successful completion of this course ,the students will be able to:	
1	List basic fundamentals of wireless communication
2	Analyze large & small scale radio wave propagation
3	Able to understand basic wireless technologies
4	Able to understand and analyze wireless concepts

Course Contents		
Unit No.1	**FUNDAMENTALS OF WIRELESS COMMUNICATION:** Wireless communication system, wireless media, Frequency spectrum, Technologies in digital wireless communication, WCOM channel specifications, Types of wireless communication, challenges in WC. Cellular concept: Introduction, frequency reuse ,Channel Assignment strategies, Handoff strategies, interface and system capacity, Trunking &grade of service, Improving coverage & capacity in cellular system	**8 Hrs.**
Unit No.2	**MOBILE RADIO PROPAGATION. LARGE SCALE PATH LOSS:** Introduction to Radio Wave propagation, Free Space propagation model, Relating Power to Electric Field, The three Basic Propagation Mechanisms, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering, Outdoor Propagation Models, Indoor Propagation Models.	**8 Hrs.**
Unit No.3	**MOBILE RADIO PROPAGATION SMALL-SCALE FADING AND MULTIPATH :** Small-Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of small-Scale Fading.	**8 Hrs.**
Unit No.4	**WIRELESS NETWORKING: INTRODUCTION TO WIRELESS NETWORKS** Difference Between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks, Common Channel Signaling (CCS),Architecture of B-ISDN & services,	**9 Hrs.**
Unit No.5	**WIRELESS LAN & BLUETOOTH** Introduction, Infrared radio transmission infrastructure and adhoc networks, Detailed study of IEEE 802.11, Bluetooth, Wireless ATM.	**7 Hrs.**
Unit No.6	**WIRELESS ACCESS PROTOCOL** WAP (Wireless Application Protocol) architecture, Wireless Datagram, Wireless Transport layer security, wireless transaction, Wireless Session, Wireless Application Environment ,WML	**8 Hrs.**

TEXT BOOKS:

1	Wireless Communications Principals & Practice- Theodore S. Rappaport, (P.E.)
2	Mobile Communications: Jachen Schiller (Addison Westy)

3	Wireless and Mobile Networks Concept and protocols – Dr. Sunil kumar S Manvi Wiley India

REFERENCE BOOKS:

1	Wireless Networks by P. Nicopolitidis, M. S. Obaidat, G. I. Papadimitriou, A. S.Pomportsis; Wiley Pub.
2	Wireless Communication & Networks by William Stallings(Pearson Edition)
3	Wireless communication and Networks by Upena Dalal(Oxford)

LIST OF EXPERIMENTS: (ANY EIGHT (8) EXPERIMENTS)

1	Study of ISDN Trainer kit Hardware & Software Setup.
2	Study of Architecture of ISDN kit.
3	Study of Analog & Digital Subscriber Link establishment using ISDN trainer kit.
4	Study of numbering plans in ISDN trainer kit.
5	Study of Establishment point to point & Multidraft Links using ISDN.
6	Study of Protocol Analysis (based on any protocol).
7	Study of Mobile Communication Set up (Study of Link Mobile Trainer Kit , Handset).
8	Study of Multiple Access Techniques (Any one).
9	Visit to Mobile Company Like BSNL , AIRTEL , Idea.
10	Implementation of outdoor propagation Model (Any one) using Matlab.
11	Implementation of Free Space propagation model using Matlab

GUIDELINES TO PAPER SETTER:

In theory ESE examination of 70 marks following points should be considered:

Q.1 MCQ's based on complete syllabus (Carries 14 Marks)
Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)
Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)
Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)
Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: VIDEO ENGINEERING

Course Details

Class	**B.Y. B. Tech. Sem-VIII**
Course Code and Course Title	**PCC- ETC 803: Video Engineering**
Prerequisites	**Electronics all basic circuits.**
Teaching scheme: Lectures + Practical	**4 Hrs. + 2 Hrs.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) + 30 (CIE)**
Practical : 2 Hrs./Week	**TW: 25 Marks, POE: 50 Marks**

Course Objectives: The course aims to :	
1	Provide basics information of TV system
2	Know color TV transmission and reception
3	Understand basic concept of digital TV system
4	Understand high definition TV
5	Know advanced TV systems like LCD, plasma, LED, CCTV
6	Provide the knowledge of digital video systems like video conferencing and video phone.

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Describe picture and sound transmission and reception
2	Explain color composite video signal
3	Describe principle of digital TV system
4	Explain high definition television system
5	Elaborate concept of video conferencing and videophone.
6	Describe advanced TV system like LCD, plasma, LED, CCTV, etc..

COURSE CONTENTS		
Unit No.1	**ELEMENTS OF A TELEVISION SYSTEM** Modulation of picture and sound signals, positive and negative modulation, aspect ratio, kell factor, horizontal and vertical resolution, video bandwidth, progressive and interlaced scanning, composite video signal, horizontal & vertical sync details, vestigial sideband correction, channel bandwidth, CCIR-B standards, monochrome TV receiver block diagram	**8 Hrs.**
Unit No.2	**COLOR SIGNAL TRANSMISSION AND RECEPTION** Color mixing theory (additive and subtractive), compatibility considerations, frequency interleaving process, luminance, hue and saturation, color difference signals, color composite video signals, chromaticity diagram, Color TV receiverblock diagram.	**7 Hrs.**
Unit No.3	**TV CAMERA TUBE, PICTURE TUBE AND COLOR TELEVISION STANDARDS** NTSC, PAL & SECAM TV standards: Introduction, Coder, decoders, Comparison, Simple PAL and delayed PAL,TV camera tubes- Vidicon, Plumbicon; Color Picture Tubes- PIL, Delta gun, Trintron; picture tubes, purity & convergence, automatic degaussing.	**7 Hrs.**
Unit No.4	**DIGITAL TV & HDTV** Merits of digital technology, digital TV signals, digitized video parameters ,digital transmission and reception, codec functions, ITT Digit 2000 IC system, MAC signals, D2- MAC/Packet signals, advantages of MAC signals, HDTV systems, HDTV standards & compatibility, the MUSE system	**8 Hrs.**
Unit No.5	**ADVANCED DISPLAY & STUDIO SYSTEMS** Stereo sound system, flat panel display TV receivers, 3-D TV picture, digital equipment for TV studios, construction & working of LED TV.	**7 Hrs.**
Unit No.6	**ADVANCED TELEVISION SYSTEM** CATV, CCTV, DTH receiver, IR remote control, Satellite TV: satellite communication system, satellite electronics	**7 Hrs.**

TEXT BOOKS:

1	Monochrome and Color TV – R.R. Gulati, 2nd revised edition, New Age International Publication
2	Modern Television Practice – Principles, Technology and Service – R.R. Gulati, 4th edition, New Age International Publication
3	Television and Video Engineering - A.M. Dhake, 2nd Edition.

REFERENCE BOOKS:

1.	Digital Video Processing-A. Murat Tekalp, Prentice Hall Signal Processing Series, BS publications.
2.	Audio-Video Engineering – R.C.Jaiswal

3.	Consumer Electronics –S P Bali, Pearson

LIST OF EXPERIMENTS: (Minimum 8 experiments)

1	Study of circuit diagram of monochrome and color a TV receiver
2	CVS for different test patterns
3	RF tuner
4	Video IF & detector
5	Sync separators (V & H)
6	Sound section
7	Horizontal section
8	Vertical section
9	DTH
10	LED TV
11	CATV
12	Trouble shooting of color TV
13	Industrial Visit

GUIDELINES TO PAPER SETTER:

In theory ESE examination of 70 marks following points should be considered,

Q.1 MCQ's based on complete syllabus. (14 Marks)
Q.2 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.3 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.4 Questions based on unit no 4, 5, 6 (Carries 14 marks)
Q.5 Questions based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: PROJECT PHASE-II

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PW-ETC701 : Project Phase-II**
Prerequisites	
Teaching scheme: Lectures +Tutorial/Practical	**0 Hrs. + 8 Hr.**
Credits	**0 + 6**
Evaluation Scheme ESE + CIE for Theory	**-**

Teaching scheme	**Examination scheme**
Practical: 8 Hrs. /Week	**-**
-	**TW: 150 Marks OE: 50 Marks**

Course Objectives: The course aims to :	
1	Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation
2	Encourage multidisciplinary research through the integration learned in a number of courses.
3	Provide a student the opportunities to apply and integrate his/her knowledge acquired throughout the undergraduate study.

Course Outcomes: After the completion of the course the student should be able to:	
1	Identify the problem statement through literature survey for project work.
2	Develop design strategy for the project work.
3	Develop presentation and interpersonal communication skills through project work.
4	Develop the ability to learn independently and to find/integrate information from different sources required in solving real-life problems.
5	enhance technical report writing skills with proper organization of materials;

- The each project group of semester one will continue the project work in semester II and complete the project in all respect (assembly, testing, fabrication, tabulation, test results etc).
- Hardcopy of project diary should be maintained group wise, where report of every week activity should be maintained, which should be presented at the time of examination
- The project work along with project report should be submitted as part of Semester II on or before the last day of the semester -II.

Semester V

Sr. No	Code No.	Subject	Semester	Credits
1.	PCC-ETC501	Signal and Systems	5	5
2.	PCC-ETC502	Electromagnetic Engineering	5	4
3.	PCC-ETC503	Digital and VLSI Design	5	5
4.	PCC-ETC504	Optical Communication	5	5
5.	OEC-ETC501	Open Elective – I	5	4
6.	PCC-ETC505	Simulation and Modeling	5	2
		Total		25

Semester VI

Sr. No	Code No.	Subject	Semester	Credits
1.	PCC-ETC601	Digital Signal Processing	6	5
2.	PCC-ETC602	Microprocessor and Microcontrollers	6	5
3.	PCC-ETC603	Power Electronics	6	5
4.	PCC-ETC604	Antenna and Wave Propagation	6	5
5.	OEC-ETC601	Open Elective – II	6	4
6.	PCC-ETC605	Mini Project	6	1
		Total		25

- **For Theory CIE 30 marks,**
  Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.
- **Guidelines to paper setter:**

  In theory ESE examination of 70 marks following pointes should be considered,

  Q.1 MCQ's based on complete syllabus. (Carries 14 Marks)

  Q.2 based on unit no 1, 2, 3 (Carries 14 Marks)

  Q.3 based on unit no 1, 2, 3 (Carries 14 Marks)

  Q.4 based on unit no 4, 5, 6 (Carries 14 Marks)

  Q.5 based on unit no 4, 5, 6 (Carries 14 Marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: DIGITAL AND VLSI DESIGN

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC503 : Digital and VLSI Design**
Prerequisites	**Fundamentals of Electronics**
Teaching scheme : Lectures + Practical	**4 Hrs. + 2 Hrs.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures : 4 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Practical : 2 Hrs. / Week	**TW: 25 Marks** **POE: 50 Marks**

Course Objectives: The course aims to :	
1	Understand principles and operations of combinational & sequential logic circuits.
2	Design & implement digital circuits (combinational & sequential) using VHDL
3	Explain students the fundamental concepts of Hardware Description Language and design flow of digital system design.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1	Apply Boolean laws/K-Map-method, to reduce a given Boolean function
2	Design & realize combinational logic circuits using logic gates.
3	Demonstrate the operation of flip-flops, counters , shift registers Synchronous sequential machine using Moore and Mealy machine
4	Design combinational and sequential logic circuits using various description techniques in VHDL

Course Contents		
Unit No: 1	**Basics of digital systems:** Generation of Switching Equations from Truth Table , Canonical forms ,K-map(Karnaugh map) 2,3,4 and 5 variables, K map with Don't care terms - Quine Mc-Cluskey minimization technique, Quine Mc-Cluskey using Don't Care Terms ,Binary codes, Code Conversion.	**7 Hrs.**
Unit No: 2	**Introduction to VHDL:** Level of abstraction. Need of HDL,VLSI Design flow, Features and capabilities of VHDL, Elements of VHDL (Entity Architecture, Library, Package, and Configuration), Modeling styles in VHDL, Identifiers, operators , Data objects, data types, literals, Delay Models, Concurrent and sequential statement.	**7 Hrs.**
Unit No: 3	**Combinational logic Design :** Adder, Subtractor, Code converters (binary to gray & gray to binary, BCD to Excess 3 and vice versa, BCD to 7 segment display),Multiplexer and Demultiplexer , Encoder, Priority encoder, Decoder, Comparator , ALU, Barrel shifter. VHDL coding for combinational circuits.	**7 Hrs.**
Unit No: 4	**Sequential logic Design:** 1-Bit Memory Cell, Latches (SR, JK, D and T), Clocked latches (SR,	**7 Hrs.**

	JK, D and T), flips flop (SR, JK, T and D). Use of preset and clear, Excitation Table for flip flops, and Conversion of flip flops, Timing parameters of FF, Shift registers (SISO, SIPO, PIPO, and PISO). VHDL coding for Sequential circuits.	
Unit No: 5	**Counters and Finite State Machines:** Counter – ripple counters ,synchronous counters , Up/down counters, Ring counters, Johnson Counter, MOD-N counter, FSM, Moore/Mealy machines, state diagram, state table, state assignment and state reduction, Sequence detector. VHDL coding for Counters and FSM.	**7 Hrs.**
Unit No: 6	**Semiconductor Memories and Programmable Logic Devices** Memory devices: ROM, PROM, EPROM, EEPROM, RAM, SRAM, DRAM, NVRAM, Programmable logic devices: PAL ,PLA,CPLD and FPGA .Logic implementation using Programmable Devices (ROM, PLA)	**7 Hrs.**

Text Books:

1	A. Anand Kumar, "Fundamentals of digital circuits", 4th edition, PHI publication, 2016
2	Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with VHDL design", Tata Mc-graw Hill

Reference Books:

1	Wakerly, "Digital Design Principles and Application", Pearson Education
2	M. Morris Mano, " Digital Design", 3rd Edition , Pearson Education
3	Roth John, "Principals of Digital System Design using VHDL", Cengage Learning.
4	R. P. Jain, "Modern digital electronics", 3rd edition, 12th reprint TATA Tata McGraw Hill Publication, 2007

List of Experiments (Minimum 8 experiment):

1	Implementation of Boolean function using IC.
2	Design and simulate half adder and full adder using VHDL.
3	Design and simulate Multiplexer and Demultiplexer using VHDL.
4	Design and simulate Comparator adder using VHDL.
5	Design and simulate 3to8 decoder using VHDL.
6	Design and simulate flip-flops using VHDL.
7	Design and simulate 4-bit up-down counter using VHDL.
8	Design and simulate Shift register using VHDL.
9	Design and simulate Sequence detector using VHDL.
10	Mini project based on above syllabus.

Note:

1) **Guidelines to paper setter: (30 % weightage to VHDL codes and 70% theory)**

2) **In theory ESE examination of 70 marks following points should be considered,**

Q.1 MCQ's based on complete syllabus. (14 Marks)

Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)

Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS & TELECOMMUNICATION ENGINEERING

SUBJECT NAME: MINI PROJECT

Course Details

Class	**T. Y. B. Tech. Sem - VI**
Course Code and Course Title	**PCC-ETC605: Mini Project**
Prerequisites	**Basics of Electronics**
Teaching scheme : Practical	**2 Hrs.**
Credits	**1**
Evaluation Scheme	**-**

Teaching scheme	**Examination scheme**
Practical : 2 Hrs. / Week	**OE: 50 Marks**
	TW: 25 Marks

Course Objectives:	
The course aims to :	
1	Provide students for knowledge of Electronics Components and soldering techniques and its package information for electronics circuit design
2	Provide students for knowledge of the assembling of electronics circuit with components on PCB (Printed Circuit Board) of circuit design.
3	Design and development of Small electronic project based on hardware and software for electronics systems**.**

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	Practice acquired knowledge within the chosen area of technology for project development.
2	Identify, discuss and justify the technical aspects of the chosen project with a

	Comprehensive and systematic approach.
3	Reproduce, improve and refine technical aspects for engineering projects
4	Work as an individual or in a team in development of technical projects.
5	Communicate and report effectively project related activities and findings.

Mini project work should consist of following steps.

1. Students should propose project ideas & finalize the project idea in consultation with guide.
2. Students should submit implementation plan in the form of PERT/CPM chart. This will cover weekly activity of project report.
3. Problem definition and specification development in the form of synopsis.
4. Design of circuit with calculation & should include a) Analog part b) digital part c) Power supply d) Test strategy if firmware is required produce flow chart.
5. Simulation of design using tools like OrCAD, Matlab, etc.
6. Design of enclosure & PCB.
7. Fabrication & assembly of PCB & enclosure.
8. Testing & calibration.
9. Measurement of specifications.

Note:-

1. Project report should include report of all above steps and conclusion.
2. Project group should demonstrate and deliver seminar on project.
3. A mini project should not exceed three students per group.

Semester III

Sr. No	Code No.	Subject	Semester	Credits
1	BSC-ETC301	Engineering Mathematics-III	3	4
2	PCC-ETC-301	Electronic Circuit Design-I	3	5
3	PCC-ETC302	Network Analysis	3	5
4	PCC-ETC303	Transducers and Measurement	3	4
5	PCC-ETC304	Analog Communication	3	4
6	PCC-ETC305	Programming Lab-I	3	3
7	MC-ETC-301	Environmental studies	3	3**
Total				**25**

**over and above credit

Semester IV

Sr. No.	Code No.	Subject	Semester	Credits
1	PCC-ETC401	Electronic Circuit Design-II	4	5
2	PCC-ETC402	Linear integrated Circuits	4	5
3	PCC-ETC403	Control System Engineering	4	4
4	PCC-ETC404	Digital Communication	4	4
5	PCC-ETC405	Data Structures	4	4
6	PCC-ETC406	Programming Lab-II	4	3
Total				25

***For Theory CIE 30 Marks,**

Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.

***Guidelines to paper setter:**

In theory ESE examination of 70 marks following pointes should be considered,

1. First question of 10 marks should be allotted to Objective type questions.
2. In Remaining 60 marks, four questions of 15 marks should be considered.

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

1. Electronic Circuit Design - I

Course Details:

Class	S.Y.B. Tech. Sem-III
Course Code & Course Title	PCC-ETC-301-**Electronic Circuit Design - I**
Prerequisites	**Basic Circuit Law's, Semiconductor diode, Zener diode, BJT details.**
Teaching scheme: Lecture/Practical	**4/2**
Credits	**4 + 1**
Evaluation Scheme CIE/ESE for Theory	**30/70**

Teaching Scheme		**Examination Scheme**
Lectures : 04 Hrs /week		Theory : 100 Marks
		70 (ESE) + 30(CIE)
Practical : 02 Hrs /week		TW: 25 Marks POE: 50 Marks

CourseObjectives:
The course aims to:

1. Provide an introduction and basic understanding of Semiconductor Devices viz. diodesand BJT, JFET.
2. Provide basic analog electronic circuit design techniques using diodes and bipolarjunction transistors and to develop analytical skills.
3. Develop student ability to apply basic engineering sciences to understand the operation& analysis of electronic circuits using diodes and bipolar junction transistors.
4. Design electronic circuits to meet the desired specifications.

Course Outcomes:
Upon successful completion of this course, the student will be able to:

1. Analyze and design electronic circuits such as rectifiers & unregulated power supply.
2. Analyze and design electronic circuits such as regulated power supply.
3. Analyze & Design of BJT & FET Biasing.
4. Explain the hybrid model of transistor and analyze the transistor amplifier (CE, CB,CC) using h-parameters
5. Analysis of CE Amplifier for low frequency & High frequency response for sinusoidal & square wave input.
6. Analyze & Design LPF, HPF, Clipper, Clampers, Multipliers

Course Contents

Unit No: 1 Wave Shaping Circuits: **08 Hrs**

Low pass & high pass RC circuits (analysis for square,step, ramp, exponential input), High pass RC circuit as a differentiator, Low pass RC circuit as integrator. Clipping circuits: diode clippers, transistor clippers, Transfer characteristics, Clamping circuits: Classification, clamping operations, Clamping circuit theorem, practical clamping circuits, and voltage multipliers.

Unit No: 2 Unregulated Power Supplies: **08 Hrs**

Rectifiers: Half wave, full wave: center tap and bridge type, analysis for different parameters: PIV, TUF, efficiency, ripple factor, regulation, form factor etc. Filters: Need of filters, Types: capacitor, inductor, LC, CLC, and Analysis for ripple factor. Design of unregulated power supply with filterusing full wave rectifier.

Unit No: 3 Voltage Regulators : **08 Hrs**

Need of voltage regulator, Stabilization factors, Analysis & Design of Shunt regulator (using Zener diode & BJT),emitter follower regulator, series pass voltage regulator (using BJT), Pre- regulator & Overload protection circuit.

Unit No: 4 BJT & FET Biasing **08 Hrs**

Introduction to BJT, Need of Biasing, Generalized stability factor derivation, Biasing of CE configuration-Fixed Bias, Collector to Base Bias & Voltage Divider Bias (Analysis & Design of the same with & without Re). Introduction to JFET,Biasing of CS configuration- Fixed Bias, Self Bias (Analysis & Design of the same).MOSFET- EMOSFET & DMOSFET (Working & Characteristics)

Unit No: 5 Voltage Amplifiers: **08 Hrs**

H-Parameters, Hybrid model for transistor (CE, CB& CC configuration), amplifier equations for Voltage Gain, Current gain, Input resistance & Output resistance taking Rg of source into account.(Numericalare expected)

Unit No: 6 Frequency Response of Single Stage RC Coupled Amplifier: **08 Hrs**

Low frequency response: Effect of emitter bypass capacitor(CE) & Coupling capacitor(CC), Amplifier response to square wave, percentage Sag calculation, (Numerical are expected)

High frequency response: Hybrid π model , Derivation for CE short circuit &resistivecurrentgain,βcutoff,αcutofffrequency,amplifier highfreq.responsetosquarewave,gainbandwidthproduct,

(Numericalare expected). Design of single stage RC coupledamplifier.

Text Books:

1. Electronic devices & circuits, Allen MottershedPrentice- Hall India
2. Electronic devices & circuits, J. Millman & C.Halkias,Tata McGraw HillPublication
3. A Monograph on ElectronicsDesignPrinciplesN.C. Goyal & R.K. Khetan-Khanna Publishers
4. Pulse digital and switchingcircuitsMillman Taub,Tata MCGraw hill 2nd edition

Reference Books:

1. Electronic devices & circuits,David A. Bell ,Oxford University
2. Electronic devices & circuits', Salivahanan, N Sureshkumar, Tata McGraw HillPublication
3. Electronic devices & circuittheory, Robert L. Boylsted, LouisNashelsky,Pearson Education

List of Experiments (Minimum 08 experiment + 01 Simulation + 01 Mini Project compulsory):

1. Design and study of Low pass filter a.Frequency response (sinusoidal)
   b. integrator (Square wave input)
2. Design and study of High pass filter a.Frequency response (sinusoidal)
   b. Differentiator (Square wave input)
3. Study of different types of clipper circuits.
4. Study of different types of clamping circuits.
5. Design and analysis of full wave rectifier with capacitive filter.
6. Design and analysis of full wave rectifier with inductive filter.
7. Design and analysis of zener shunt regulator
8. Design and analysis of transistorized shunt regulator
9. Design and analysis of emitter follower regulator
10. Design and analysis of series pass voltage regulator
11. Determination of H-parameter for CE configuration using input and output characteristics.
12. Simulation of FWR using C-filter
13. Simulation of Single stage RC-Coupled Amplifier
14. Mini Project (PCB Design)
    a. Design of FWR (Different output voltages for different groups)with C filter.
    b. Design of Single Stage RC Coupled Amplifier (Different voltage Gain for different groups).

Guidelines for Paper Setter: 70 marks.

Q.1. 10 MCQ's based on complete syllabus. (10 Marks)

Q.2 & Q. 3 Based on unit no 1,2,3 (Each carries 15 marks)

Q.4 & Q. 5 Based on unit no 4,5,6 (Each carries 15 marks)

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

5.Analog Communication

Course Details:

Class	B. Tech. Sem-III
Course Code & Course Title	PCC-ETC-304-Analog Communication
Prerequisites	Basics of baseband communication
Teaching scheme: Lecture/Practical	**3/2**
Credits	**3 + 1**
Evaluation Scheme CIE/ESE for Theory	**30/70**

Teaching Scheme		**Examination Scheme**
Lectures : 03Hrs /week		Theory : 100 Marks
		70 (ESE) + 30(CIE)
Practical : 02 Hrs /week		TW: 25 Marks POE: 50 Marks

CourseObjectives:

The course aims to:

The basic objective of this course is to introduce the students with analog communication, AM, FM modulation techniques, their analysis, bandwidth calculations.Italsofocusesontheperformanceanalysisofanalogcommunications systems under the presence of noise and finally introduces the pulse and digital modulation techniques.

CourseOutcomes:

Upon successful completion of this course, the student will be able to:

1. Understandandidentifythefundamentalconceptsandvariouscomponentsofanalog communication systems.
2. Understand, analyze and explain various analog modulation schemes.
3. Understand the performance of analog communications systems under the presence of noise.
4. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems
5. Analyze Basic communications systems and their performance under the presence of noise
6. Differentiate between various pulse modulation techniques

Course Contents

UnitNo: 1 **Amplitude Modulation:** **8Hrs**

Elements of electronic communication systems, Need for modulation, channel, frequency spectrum, time and frequency domain signals, Amplitude Modulation principles, AM envelope, frequency spectrum & BW, Modulation index, % modulation, AM transmitters: Block of low level DSBFC, High level DSBFC, Trapezoidal patterns Evolution and descriptions of SSB, Suppression of carrier using balanced modulator, Suppression of unwanted sideband, Methods: Filter system, phase shift & third method Vestigial sideband(VSB)

UnitNo: 2	**Angle Modulation:** Instantaneous frequency, Concept of angle modulation, frequency spectrum, Narrowband& WideBand FM, Modulation Index, Bandwidth, Phase modulation, Bessel,^{s} Function and its mathematical Analysis, Generation of FM (Direct and Indirect Method)	**6Hrs**
UnitNo: 3	**Noise:** Sources of noise, Types of noise White noise, shot noise, thermal noise, partition noise, low frequency or flicker noise, burst noise, avalanche noise,signal to noise ratio, Noise Figure, Noise Temperature, FRISS formula for noise figure	**4Hrs**
UnitNo: 4	**AM Receiver:** Simplified block diagram of AM receiver, receiver parameters: Sensitivity, Selectivity, dynamic range, Tracking, fidelity, Types of AM receiver: TRF and superheterodyne (block diagram), AM detection types: using diode detector, distortion in diode detector. Negative peak clipping & diagonal clipping, Demodulation of SSB Automatic Gain Control (AGC).	**6Hrs**
UnitNo: 5	**FM Receiver:** Double conversion FM receivers, block diagram, FM demodulator, tuned circuit frequency discriminators, slope detectors, fosters seeley discriminator, ratio detectors,PLL-FM demodulators, FM noise suppression	**6Hrs**
UnitNo: 6	**Pulse Modulation :** Introduction, Sampling theorem: Occurrence of allising error, PAM: Channel BW for PAM, Natural Sampling, Flat-top Sampling, PAM & TDM, Signal Recovery,; PWM: Uses of PWM, Genration of Analog W/F using PWM, PPM: Generation of PAM, Generation of PWM, Generation of PPM	**6Hrs**

Text Books:

1. George Kennedy, "Electronic Communications", McGraw Hill Kennedy.
2. WayneTomasi'ElectronicsCommunicationSystem'-FundamentalsthroughAdvanced.-Vth Edition- Pearson Education.
3. V. Chandra Sekar, "Analog Communication", OXFORD University press.

Reference Books:

1. B.P. Lathi, "Analog and Digital Communication", OXFORD University press.
2. Simon Haykin, "An introduction to analog & digital communications", John Wiley &Sons
3. RPSingh,SDSapre'CommunicationSystem-Analog&Digital'IIndEdition– TataMcGraw Hill Publication
4. Blake"Electronic Communication Systems",2nd Edition CENGAGE learning
5. Louis E. Frenzel, "Principals of electronic communication system", IIIrd Ed., TMH Pub

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Name of subject: Programming Lab-I

Course Details:

Class S.Y. B. Tech. Sem-III

Course Code & Course Title	PCC-ETC-305
Prerequisites	Computer fundamentals
Teaching scheme: Lecture/Practical	**2/2**
Credits	**3**
Evaluation Scheme CIE/ESE for Theory	

Teaching Scheme		**Examination Scheme**
Lectures: 2hrs /week		Theory : Marks
Tutorial - /week		
Practical : 2hrs /week		TW: 25 Marks POE: 50 Marks

Course Objectives:

The course aims to:

1 To understand how to design flowchart and algorithms for procedure oriented programs.

2 To develop programming skills using the fundamentals and basics of C Language, control structures and looping statements.

3 To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.

4 To design and implement programs using files handling and user defined types.

Course Outcomes:

Upon successful completion of this course

1 Student will be able to understand the basic concepts of procedure oriented programming language.

2 Student will be able to use the control statements, looping statements and functions concepts.

3 Student will be able to design programs using user defined functions and data type.

4 Student will be able to design & apply the skills for solving the engineering problems.

Course Contents

1. Programming Fundamentals,	Flow chart, Algorithm, Standard notations, Selection Procedure, Loops, Sub Algorithms, Compilers, Interpreters, The Library and Linking	04 Hrs
2. Introduction to C	Introduction to Constants, Variables, Data Types, Operators, Expressions, Structure of C Programming, Identifiers, Decision & Loop control statements	05 Hrs
3. Arrays and Structures	Arrays::Introduction to 1-Dimensional arrays, Declaration and Initialization of 1-Dimensional arrays, Declaration and Initialization of 2-Dimensional arrays, Declaration and Initialization of Multi-Dimensional arrays. Structures-Declaring of Structures, Accessing Structure elements, arrays of structures.	04 Hrs

4.	Functions and Pointers	Introduction of functions, Need for functions,, Multifunction Programming, Elements of functions, Definition and declaration of functions, return values and their types, function call, arguments, return value, nesting and recursion Pointers- Introduction to pointers, pointer variables, Declaration and initialization of pointer variable, accessing pointer	05 Hrs
5.	Strings	Declaration and Initialization of string, Reading from Terminal, Writing to screen, Standard library string functions	03 Hrs
6.	File handling	File operation, counting character tabs, spaces ,file copy program, file opening modes, text file- binary file, Real time case study.	03 Hrs

Text Books:

1 **Let Us C Yashawant Kanetkar, 13th Edition BPB Publications (unit II, VI)**

2 **Programming in ANSI C , E Balagurusamy, 5th edition, Tata Mc Graw Hill (unit III. IV, V)**

Reference Books:

1 **The C Programming Language, Brian W. Kernighan, Dennis M. Ritchi , IInd edition, Prentice Hall of India.**

List of Experiments (Minimum 10 + mini project):

1. Develop Program using decision control statements
2. Develop Program using control statements
3. Develop Program using loop control statements
4. Develop Program using functions
5. Develop Program using pointers
6. Develop Program using array
7. Develop Program using two dimensional arrays
8. Develop Program using structures
9. Develop Program using dynamic memory allocation
10. Develop Program using strings
11. Develop Program using any sorting technique
12. Develop Program using file handling.
13. Mini project

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Environmental Studies

Course Details:

Class	S.Y. B. Tech. Sem-IV
Course Code & Course Title	MC-ETC-301-Environmental Studies
Prerequisites	Basic knowledge about natural process and fundamentals of environmental aspects.
Teaching scheme: Lecture/Practical	3 lectures/week
Credits	3**

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Electronic Circuit Design - II

Course Details:

Class	S.Y.B. Tech. Sem-IV
Course Code & Course Title	PCC-ETC-401-Electronic Circuit Design - II
Prerequisites	**Basic Circuit Law's, Single Stage RC coupled amplifier**
Teaching scheme: Lecture/Practical	**4/2**
Credits	**4 + 1**
Evaluation Scheme CIE/ESE for Theory	**30/70**

Teaching Scheme		**Examination Scheme**
Lectures : 04 Hrs /week		Theory : 100 Marks
		70 (ESE) + 30(CIE)
Practical : 02 Hrs /week		TW: 25 Marks POE: 50 Marks

CourseObjectives:

The course aims to:

1 Provideanintroductionandbasicunderstanding of feedbackamplifiers,poweramplifiers, oscillators,multivibrators

2 Developstudentabilitytoapplybasicengineeringsciencestounderstandtheoperation & analysis of electronic circuits using diodes, bipolar junction transistors and field effecttransistors

3 Provideanalogelectroniccircuitdesigntechniquesusingdiodes,bipolarjunction transistorsandfieldeffecttransistors,andtodevelopanalyticalskills.

4 Design electronic circuits to meet desired specifications.

5 Applyknowledgeofmathematics,science,andengineeringtodesign,analyzeand implement electroniccircuits.

Course Outcomes:

CourseOutcomes:

Upon successful completion of this course, the student will be able to:

1 Analyze & Design Multistage Amplifier
2 Analyze & Design Feedback Amplifier
3 Analyze & Design Power Amplifier
4 Describe & Design Different types of Oscillators using BJT
5 Describe & Design Different types of Multivibrators using BJT
6 Describe & Design IC voltage Regulators

Course Contents

Unit No: 1	**Multistage Amplifiers** Need of cascading, Parameter evaluation such as Ri ,Ro, Av, Ai & bandwidth for general multistage amplifier, Design of two stage RC coupled, Direct coupled amplifier using BJT.	**7 Hrs**
Unit No: 2	**Feedback Amplifiers :** General theory of feedback, reasons for negative feedback. Analysis of Voltage series, Current series, Voltage shunt, Current shunt feedback amplifiers, Design of two stage Voltage series feedback amplifier.	**8 Hrs**
Unit No: 3	**Power Amplifiers:** Need of Power amplifier, classification of power amplifier, Power considerations, Distortion in power amplifiers: Phase, Frequency, amplitude/ harmonic / nonlinear distortion, amplitude distortion using Three point method.analysis and design of Class A single ended transformer coupled amplifier& class A Push pull amplifiers, Class B amplifier & class B push pull amplifier , crossover distortion, class AB Push pull amplifiers.Complementary symmetry push pull power amplifier.	**10 Hrs**
Unit No: 4	**Oscillators:** Barkhausen's criteria, Frequency and amplitude stability,Classification, RC oscillators : analysis & design of RC phase shift & Wein bridge oscillator using BJT. LC oscillators: analysis & design of Colpit's & Hartely's oscillators using BJT, Crystal oscillator.	**9 Hrs**
Unit No: 5	**Multivibrators :** Transistor as a switch, Different transistor switching parameters,overdrive factor, classification of multivibrators, Analysis and design of collector coupled -Astable, Monostable,fixed bias and self-bias Bistable multivibrator and Schmitt trigger using BJT considering overdrive factor. Triggering circuits forMultivibrators	**9 Hrs**
Unit No: 6	**IC voltage regulator** Study and design of regulators using IC's :78XX, 79XX,LM723,LM317, LM337.	**5 Hrs**

Text Books:

1 A Monograph on ElectronicsDesignPrinciplesN.C. Goyal & R.K. Khetan- Khanna Publishers

2 Electronic devices & circuits, Allen MottershedPrentice- Hall India

3 Electronic devices & circuitsG. K. Mittal
4 Pulse digital and switchingcircuits,Millman Taub, Tata McGraw Hill

Reference Books:

1 Electronic devices & circuits,David A. Bell ,Oxford University
2 Electronic devices & circuits', Salivahanan, N Sureshkumar, Tata McGraw HillPublication
3 Electronic devices & circuittheory, Robert L. Boylsted, LouisNashelsky,Pearson Education

List of Experiments (Minimum 08 experiment + 01 Simulation + 01 Miniproject compulsory):

1. Design and frequency response of direct coupled amplifier.
2. Design and frequency response of two stage RC coupled amplifier.
3. Design and frequency response of voltage series feedback amplifier.
4. Design of transformer coupled class A amplifier.
5. Design of RC phase shift oscillator using BJT
6. Design of wein bridge oscillator using BJT
7. Design of colpitts oscillator using BJT
8. Design of hartley oscillator using BJT
9. Design of Astable multivibrator
10. Design of monostable multivibrator using BJT
11. Design of bistable multivibrator using BJT

12 Design of Schmitt trigger using BJT

13 Design of voltage regulator using LM317

14 Design of voltage regulator using IC723

15 Simulation of Oscillator

16 Simulation of Multivibrator

17 Miniproject (PCB Design)

   c. Design of Astable Multivibrator or Schmitt trigger.
   d. Design of Power Supply using IC voltage Regulator.

Guidelines for Paper Setter: 70 marks.

Q.1. 10 MCQ's Based on complete syllabus. (10 Marks)

Q.2 & Q. 3 Based on unit no 1,2,3 (Each carries 15 marks)

Q.4 & Q. 5 Based on unit no 4,5,6 (Each carries 15 marks)

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Name of Subject: Programming Lab-II

Course Details:

Class	S.Y. B. Tech. Sem-IV
Course Code & Course Title	PCC-ETC-406
Prerequisites	Computer fundamentals
Teaching scheme: Lecture/Practical	**2/2**
Credits	**3**
Evaluation Scheme CIE/ESE for Theory	

Teaching Scheme		**Examination Scheme**
Lectures: 2hrs /week		Theory : Marks
Tutorial - /week		
Practical :2hrs /week		TW: 25 Marks POE: 50 Marks

Course Objectives:

The course aims to:

1. To understand features of object-oriented programming and design C++ classes
2. To understand how to overload functions and operators in C++.
3. To learn how to implement copy constructors and class member functions.
4. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
5. To learn how design inheritance for code reuse in C++.
6. To learn how to design and implement generic classes with C++ templatesand exception handling

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Student will be able to understand the basic concepts of procedure oriented programming language.
2. Student will be able to use the class, objects, function and operator overloading concepts
3. Student will be able to understand and implement the concept of inheritance, template and exception handling applications
4. Student will be able to design & apply the skills for solving the engineering problems.

Course Contents		
UNIT 1	**Introduction To Object Oriented Programming** Difference between procedure oriented programming and object oriented programming, basic concepts and features of object oriented programming, structures and classes, declaration of class, member functions, defining the object of class, accessing member of class, array of class objects**.**	**04**
UNIT : 2	**Overloading** Function overloading, assignment operator overloading, binary operator overloading, unary operator overloading.	**04**

UNIT : 3	**Constructors And Destructors** Constructors- copy constructor, default constructors, destructors, inline member function, friend function, dynamic memory allocation.	**04**
UNIT : 4	**Polymorphism** Polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions, abstract base classes, constructor under inheritance, destructor under inheritance, virtual destructors, virtual base classes.	**04**
UNIT : 5	**Inheritance** Introduction, Single Inheritance, Types Of Base Classes- Direct, Indirect, Array Of Class Object And Single Inheritance, Multiple Inheritances.	**04**
UNIT : 6	**Template And Exception Handling** Function template, class template, exception handling.	**04**

Text Books:

1 Programming with C++ D Ravichandran, II edition, Tata Mc Grow Hill

2 Object oriented Programming with C++, E Balagurusamy, Mc Grow Hill

Reference Books:

1 The C++ Programming Language, Brian W. Kernighan, Dennis M. Ritchi , IInd edition, Prentice Hall of India.

List of Experiments (Minimum 10 + mini project):

1. Develop a Program for implementation of array
   a) One-dimensional array
   b) Multi-dimensional array
2. Develop a Program for implementation of classes and Objects.
3. Develop a Program for implementation of types of constructor
   a. Default constructor
   b. Parameterized constructor
   c. Copy constructor
4. Develop a Program for implementation of polymorphism
5. Develop a Program for implementation of Friend Functions in Class
6. Develop a Program for implementation of types of inheritance
   a. Single level Inheritance
   b. Multi-level Inheritance
   c. Multiple Inheritance
   d. Hybrid Inheritance
   e. Hierarchical inheritance
7. Develop an Object oriented Program to Insert the Number in an Array
8. Develop an Object oriented program to Delete the Number in an Array
9. Develop an Object oriented program on Bubble Sort
10. Develop an Object oriented program to Perform Linear or binary search
11. Develop an Object oriented program to Insert and delete a Node in Link List
12. Develop an Object oriented program to implement stack using linked list.
13. Mini project.

SHIVAJI UNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

FINAL YEAR (FINAL YEAR B. Tech) BACHELOR OF TECHNOLOGY

IN

Computer Science and Engineering

To be introduced from the academic year 2021-22

(w.e.f. June 2021) onwards

	FINAL YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																
	SEMESTER - VII																
		TEACHING SCHEME							EXAMINATION SCHEME								
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK	
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.
1	PCC-CS701 Advanced Computer Architecture	4	4	4	1	1			CIE ESE	30 70	100	40			25	10
2	PCC- CS702 Cloud Computing	3	3	3			1	2	CIE ESE	30 70	100	40			25	10
3	PCC- CS703 Advanced Database Systems	3	3	3			1	2	CIE ESE	30 70	100	40	50	20	25	10
4	PCE- CS704 Elective-I	3	3	3	1	1			CIE ESE	30 70	100	40			25	10
5	PCC- CS705 Web Technologies	3	3	3			2	4					50	20	50	20
6	PW- CS706 Project – I						2	4					50	20	50	20
7	SI-CS707 Internship						1								50	20
	Total (SEM –VII)	***16***	***16***	***16***	***2***	***2***	***7***	***12***			***400***		***150***		***250***	

	FINAL YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																	
	SEMESTER - VIII																	
		TEACHING SCHEME							EXAMINATION SCHEME									
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK			
		Credits	N0. Of Lectures	No. of Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.		
1	PCC- CS801 Big Data Analytics	4	4	4			1	2	CIE ESE	30 70	100	40	50	20	25	10		
2	PCC- CS802 Deep Learning	3	3	3	1	1			CIE ESE	30 70	100	40			25	10		
3	PCE- CS803 Elective-II	3	3	3	1	1			CIE ESE	30 70	100	40			25	10		
4	PCE- CS804 Elective-III	3	3	3	1	1			CIE ESE	30 70	100	40			25	10		
5	PCC- CS805 Mobile Application Development	3	3	3			2	4					50	20	50	20		
6	PW- CS806 Project – II						2	4					50	20	50	20		
7	HM-CS807 Professional Skills				1	1									50	20		
	Total (SEM –VIII)	***16***	***16***	***16***	***4***	***4***	***5***	***10***			***400***		***150***		***250***			
	Total	**32**	**32**	**32**	**6**	**6**	**12**	**22**			**800**		**300**		**500**			

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for Final Yr. Sem VII & VIII : **800 + 800 =1600**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for Final Yr. Sem VII & VIII: **50 (SEM-VII: 25 + SEM -VIII: 25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note:

1. **PCC-CS:** Professional Core Course – Computer Science and Engineering are compulsory.
2. **PCE-CS:**ProfessionalCoreElective–ComputerScienceandEngineeringarecompulsory
3. **HM-CS:** Humanities and Management- Computer Science and Engineering are compulsory.
4. **PW-CS:** Domain Specific Mini Project -– Computer Science and Engineering are compulsory.
5. **SI-CS:** Internship-Computer Science and Engineering are compulsory.

Professional Core Elective – I

1. Artificial Intelligence
2. Software Testing & Quality Assurance
3. Image Processing

Professional Core Elective – II

1. Project Management
2. Natural Language Processing
3. Ad-Hoc Wireless Sensor Networks

Professional Core Elective – III

1. High Performance Computing
2. Blockchain Technologies
3. Human computer Interaction

Final Year B. Tech (Computer Science and Engineering)

Semester-VII

1. Advanced Computer Architecture (PCC-CS701)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :4 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: 25 Marks**
Practical :- NA	**Practical :NA**

Pre-requisites: Digital systems and microprocessors, computer organization and architectures.

Course Objectives

1. To make students know about the Parallelism concepts in Programming
2. To give the students an elaborate idea about the different memory systems and buses.
3. To introduce the advanced processor architectures to the students.
4. To make the students know about the importance of multiprocessor and multi- computers.
5. To study about data flow computer architectures

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Demonstrate concepts of parallelism in hardware/software.
2. Discuss memory organization and mapping techniques.
3. Describe architectural features of advanced processors.
4. Interpret performance of different pipelined processors.
5. Explain data flow in arithmetic algorithms.
6. Development of software to solve computationally intensive problems.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis:** a) Parallel Processing Mechanisms b) Parallel Computer Structures: Pipeline Computers c) Array Processors d) Multiprocessor Systems e) Architectural classification Schemes: Multiplicity of Instruction-Data Streams f) Trends in power and energy in Integrated Circuits g) Trends in Cost h) Dependability	7
2.	**Principles of Pipeline:** a) Principles of linear pipeline b) Classification of Pipelined Processors c) Interleaved memory organization d) Hazard detection and resolution e) Basic compiler Techniques for Exposing ILP	6
3.	**Memory Hierarchy Design :** a) Introduction b) Ten Advanced optimizations of cache performance	5
4.	**Data Level Parallelism in Vector, SIMD and GPU Architecture:** a) Vector Processing requirement: Characteristics of vector processing b) Multiple vector Task dispatching c) Pipelined vector processing methods d) Associative Array Processing: Associative Memory Organization e) Associative processors (PEPE and STARAN) f) Data Level Parallel in Vector :Introduction g) Vector Architecture	7
5.	**Data Level Parallelism in SIMD and GPU Architecture:** a) SIMD ARRAY PROCESSORS: SIMD Computer organization b) Masking and Data Routing Mechanism c) SIMD Instruction set extension for Multimedia d) Graphics Processing Units : Programming the GPU e) NVIDA GPU Computational structures f) NVIDA GPU Instruction set Architecture g) Conditional Branching in GPU h) NVIDA GPU Memory Structure	7

6.	**Multiprocessor Architecture :** a) Introduction b) Multiprocessor Architecture: Issus and Approach c) Challenges of parallel processing d) Centralized shared memory Architecture: Multiprocessors Cache coherence e) Basic schemes for enforcing coherence f) Snooping Coherence Protocols g) Distributed shared memory and directory based coherence h) Directory Based cache coherence protocol :The basics	7

Term Work

- It should consist of minimum 8-10 assignments with emphasis on solving exercise problems

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Computer architecture and Parallel Processing	Kai Hwang and Faye A Briggs	Tata McGraw-Hill	Unit No 01: a) 1.2.2 b) 1.3.1 c)1.3.2 d)1.3.3 e) 1.4.1 Unit No:02 : a)3.1.1 b)3.1.2 c)3.1.4 d)3.3.4 Unit No:04 : a) 3.41 b)3.4.2 c)3.4.3 d)5.4 e)5.4.2 Unit No:05 a)5.1.1 b)5.1.2
2	Computer Architecture: A Quantitative Approach	John L. Hennessy and Davd A. Patterson	Morgan Kaufmann	Unit No 01: f)1.5 g)1.6 h) 1.7 Unit No 02 : f) 3.2 Unit No 03: a)2.1 b)2.2 Unit No:04 : f)4.1 g)4.2 Unit No:05 : c) 4.3 d)4.4 e)4.4 f)4.4 Unit No:06 : Chapter 5

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Advanced computer Architecture	DezsoSima, Terence Fountain & Peter Kacsuk	Pearson Education
2	Parallel Programming Techniques & Applications using Networked Workstations &Parallel Computers	Barry Wilkinson & Michael Allen	Pearson Education
3	Advanced Computer Architecture	Kai Hwang & NareshJotwani	McGraw Hill Publications

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2. Cloud Computing (PCC – CS702)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : NA	**Term work: 25 Marks**
Practical : 2 Hrs./Week	**Practical :NA**

Pre-requisites: Operating Systems, Fundamentals of Computer Networks.

Course Objectives

1. To become familiar with Cloud Computing and its ecosystem.
2. To learn basics of virtualization and its importance.
3. To evaluate in-depth analysis of Cloud Computing capabilities.
4. To give technical overview of Cloud Programming and Services.
5. To understand security issues in cloud computing.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Describe the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.
2. Explain the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Collaboratively research on the state of the art (and open problems)in cloud computing.
4. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.
5. Choose the appropriate technologies, algorithms, and approaches for the related issues.
6. Display new ideas and innovations in cloud computing.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Overview of computing paradigm:** Recent trends in Computing - Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Evolution of cloud computing - Business driver for adopting cloud computing. **Introduction to Cloud Computing:** Cloud Computing - Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers. Properties, Characteristics&	5

	Disadvantages - Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing. Role of Open Standards.	
2.	**Cloud Computing Architecture:** Cloud computing stack - Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services. Service Models (XaaS) - Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS). Deployment Models, Public cloud, Privatecloud, Hybrid cloud, Community cloud	6
3.	**Virtualization:** Introduction and benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanism, Open-Source Virtualization Technology, XenVirtualization Architecture, Binary Translation with Full Virtualization, Paravirtualization, Virtualization of CPU, Memory and I/O Devices	6
4.	**Infrastructure as a Service (IaaS):** Introduction to IaaS - IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine (VM). Resource Virtualization - Server, Storage, Network. Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage incloud computing (storage as a service). Renting, EC2 Compute Unit, Platform and Storage, pricing, customers. **Platform as a Service (PaaS):** Introduction to PaaS - What is PaaS, Service Oriented Architecture (SOA). Cloud Platform and Management - computation, storage **Software as a Service (SaaS):** Introduction to SaaS, Web services, Web 2.0, Web OS, Case Study on SaaS	6
5.	**Service Management in Cloud Computing:** Service Level Agreements (SLAs), Billing& Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing **Cloud Security:** Infrastructure Security - Network level security, Host level security, Application-level security. Data security and Storage - Data privacy and security Issues, Jurisdictional issues raised by Data location: Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations	7
6.	**Case study on Open Source and Commercial Clouds –** Amazon EC2, Google Compute Engine, Microsoft Azure, Cloud foundry, OpenStack	5

Term Work

- Minimum of 10 Experiments to be performed from the list given below.

Experiment List

1. Working and Implementation of Infrastructure as a service.
2. Working and Implementation of Software as a service.
3. Working and Implementation of Platform as a services.
4. Practical Implementation of Storage as a Service.
5. Installing a private cloud.
6. Installing OS on a Virtual Machine Monitor.
7. Offline migration of virtual OS.
8. Live migration of virtual OS.
9. Study and implementation of infrastructure as Service using Open Stack.
10. Assignment to install and configure Google App Engine.
11. Hands on virtualization using Xen Server.
12. Hands on containerisation using Docker.
13. Deployment and Configuration options in Amazon (AWS).
14. Deployment and Configuration options in Google Cloud.
15. Deployment and Configuration options in Microsoft Azure.
16. Building a 'HelloWorld' app for the cloud.
17. Deploying the 'HelloWorld' app for the cloud.
18. Case study on Amazon EC2 to learn about Amazon EC2,Amazon Elastic Compute Cloud is a central part of Amazon.com's cloud computing platform, Amazon Web Services. How EC2 allows users torrent virtual computers on which to run their own computer applications.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Cloud Computing for Dummies	Judith Hurwitz, R. Bloor, M.Kanfman, F.Halper	WileyIndia Edition	Unit - I, II, IV, V
2	Cloud Computing Black Book	Jayaswal, Kallakurchi, Houde, Shah	DreamtechPress	Unit-III
3	Cloud Security	Ronald Krutz and Russell Dean Vines	Wiley-India	Unit-V
4	Enterprise Cloud Computing	GautamShroff	Cambridge	Unit -VI

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Google Apps	Scott Granneman	Pearson
2	Cloud Security & Privacy	Tim Mather, S.Kumaraswammy, S.Latif	SPD, O'REILLY
3	Cloud Computing: A Practical Approach	Anthony T.Velte, et.al	McGraw Hill
4	Cloud Computing: Principles and Paradigms	Rajkumar Buyya, James Broberg, Andrzej Goscinski	Wiley India
5	Cloud Computing for Dummies	Judith Hurwitz, Marcia Kaufman, Fern Halper, Robin Bloor	Wiley Publication
6	Cloud Computing Bible	Barrie Sosinsky	Wiley India
7	Cloud Computing	Michael Miller	Que Publishing

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3. Advanced Database Systems (PCC- CS703)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week (3 Credits)	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :NA	**Term work: 25 Marks**
Practical :2 Hrs. /Week (1 Credit)	**POE :50 Marks**

Pre-requisites: Database Engineering, SQL Basics.

Course Objectives

1. To learn Basics of design of databases.
2. To acquire knowledge on parallel and distributed databases and its applications.
3. To study the usage and applications of SQL and NOSQL databases.
4. To Understand and perform common database administration tasks, such as database monitoring, performance tuning, data transfer, and security.
5. To understand the usage of advanced data mining techniques.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Understand and identify issues arising from parallel and distributed processing of data.
2. Select appropriate database and construct solution to real world problems of storing large data.
3. Compare and Contrast NoSQL databases with each other and Relational Database Systems.
4. Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
5. Learn database administration tasks and security measures.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Section - I** **Unit I: Parallel and Distributed Databases** Parallel Systems, Parallel Database Architectures, Parallel Databases -- I/O Parallelism, Design of Parallel Systems, Distributed Systems, Distributed Database Concepts, Distributed Data Storage, Distributed Transactions, Commit Protocols, Distributed Query Processing, Case Studies-Distributed Databases in Oracle.	6
2.	**Unit II: Advanced SQL** SQL Functions, Oracle Sequences, Synonyms, Updatable Views, Procedural SQL, Triggers, Stored Procedures, PL/SQL Processing with Cursors, Embedded SQL, Dynamic SQL. Case study-Postgrey SQL.	4
3.	**Unit III: NoSQL Database Management** **NOSQL: Definition and Introduction**, Features and Types of NOSQL databases, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases. **NOSQL: Getting Initial Hands-On Experience**, Storing and Accessing Data, Storing Data in and Accessing Data from MongoDB, Querying MongoDB**, Interfacing and Interacting with NOSQL**, Case Study-CouchDB, CouchDB vs. MongoDB,Compass / Atlas GUI Tools for MongoDB.	8
4.	**Section - II** **Unit IV: Database Administration and Security** The Need for and Role of a Database in an Organization, The Evolution of the Database Administration Function, The Database Environment's Human Component, Security, Database Administration Tools: The Data Dictionary, CASE Tools, developinga Data Administration Strategy, The DBA at Work: Using Oracle for Database Administration.	7
5.	**Unit V: Business Intelligence and Data Warehouses** The Need for Data Analysis, Business Intelligence, Business Intelligence Architecture, Decision Support Data, The Data Warehouse, Online Analytical Processing, Star Schemas, SQL Extensions for OLAP, Materialized Views, Case Study- FireBase-Google.	7
6.	**Unit VI: Introduction to Data Mining** Introduction, Basic Data Mining Tasks, Data Mining Versus Knowledge Discovery in Databases, The Development of Data Mining, Data Mining Issues, Data Mining Metrics, Social Implications of Data Mining, Data Mining from a Database Perspective, The Future.	4

Term Work

Minimum10- 12 experiments to be performed from below mentioned experiment list.

Experiment List

1. Installation of Oracle / MySQL and practicing DDL & DML commands.
   Execute basic utilities used to interact with Oracle DBMS / MySQL.
2. Design and implement the Fragmentation schema & the Replication schema for the social networking websites / online e-shopping / e-learning websites.
3. Implementation of 2 Phase Commit protocol for distributed databases.
4. Execute partitioning queries on parallel databases.
5. Implementation of Oracle Synonyms and Sequence.
6. Demonstrate SQL Functions, Procedures, Cursors, and triggers using PL/SQL, Views.
7. Installation of MongoDB and Apache Cassandra.
8. Exploring MongoDB, and Apache Cassandra basics, Identify the schema design and data modeling techniques in MongoDB.
9. Accessing MongoDB and Apache Cassandra from some of thepopular high-level programming languages. Perform Create, Retrieve, Update and Delete or CRUD operations in MongoDB.
10. Install CouchDB on Windows.
11. Create and delete CouchDB database. Run CouchDB query with Mongo.
12. Case study of Oracle Database Administration and Security.
    Study of database administrator's responsibilities like –
    i) Installing and upgrading the database server and/or application tools.
    ii) Creating user’s profiles and ensuring system security by careful allocation of user permissions.
    iii) Monitoring technical support for both database systems and related applications.
13. Study of CASE concept and tools.
14. Demonstrate all OLAP operations and cube operator in OLAP.
15. Consider a case study of any Big Data system of your choice and design the distributed database architecture and analyze the probable solutions available in the market.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Database System Concepts	Silberschatz, Korth, Sudarshan	MGH, 6th Edition (International edition) 2010	Unit 1
2	Database Systems, Design,Implementation and Management	Coronel-Morris- Rob	Cengage Learning, Ninth Edition	Unit No.2, 4, 5
3	Professional NoSQL	Shashank Tiwari	John Wiley & Sons, Inc. 2011	Unit No.3
4	Data Mining	Margaret H. Dunham	Pearson Education	Unit No. 6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Database Management System	Raghu Ramkrishnan, Johannes Gehrke,	MGH, [4e], 2015
2	Fundamentals of Database Systems	R. Elmasri S. B. Navathe,	Addison Wesley, 2015
3	NoSQL Distilled: A brief guide to merging world of Polyglot persistence,	Pramod J. Sadalage and Marin Fowler	Addison Wesley, 2012.
4	Business Intelligence - Data Mining and optimization for Decision Making- -	Carlo Vercellis	A John Wiley and Sons, Ltd., Publication
5	Advanced Database Management System	Rini Chakrabarti -Shilbhadra Dasgupta	Wiley-India Pvt Ltd.
6	Database Systems: A Practical Approach to Design, Implementation and Management,	Thomas Connolly, Carolyn Begg	6th Edition,2012.

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4. Artificial Intelligence (PCE– CS704) Elective-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week (3 Credits)	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hr. /Week (1 Credit)	**Term work: 25 Marks**
Practical :	**Practical : –**

Pre-requisites: Basic Programming in Python.

Course Objectives

1. To impart artificial intelligence principles, techniques, and its history.
2. To assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving engineering problems.
3. To develop intelligent systems by assembling solutions to concrete computational problems.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Evaluate Artificial Intelligence (AI) methods and describe their foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.
3. Demonstrate knowledge of reasoning and knowledge representation for solving real world problems.
4. Analyze and illustrate how search algorithms play vital role in problem solving.
5. Illustrate the construction of learning and expert system.
6. Discuss current scope and limitations of AI and societal implications.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Artificial Intelligence and Its Issues:** Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Uncertainty and towards Learning Systems.	5
2.	**Overview to Problem Solving&Heuristic Search:** Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement. Types, Game playing mini-max algorithm, Alpha-Beta Pruning	6
3.	**Probabilistic Reasoning & Markov Decision process:** Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model. MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.	7
4.	**Learning Systems & Expert Systems:** Forms of Learning Types - Supervised, Unsupervised, Reinforcement Learning, LearningDecision Trees. Expert Systems - Stages in the development of an Expert System - Probability based ExpertSystems - Expert System Tools - Difficulties in Developing Expert Systems - Applications ofExpert Systems.	7
5.	**Reinforcement Learning:** Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.	5
6.	**AI with Python:** Study of important inbuilt libraries of Python like NumPy, SciPy, matplotlib, nltk, SimpleAI. Installing Python. Setting up PATH. Running Python. Study of real time applications of AI with Python, Case Studies: AI Platforms-Azure ML, Google AI, Swift AI, Tensorflow.	6

Term Work

- Minimum 8 tutorials to be performed from the list given below.
- Practical should include the implementation and use of the above mechanisms/Algorithms/Tools /Techniques.
- Implementation can be in Python Programming Language.

Tutorial List

1. Write a program to conduct uninformed and informed search.
2. Write a program to conduct game search.
3. Write a program to construct a Bayesian network from given data.
4. Write a program to infer from the Bayesian network.
5. Write a program to run value and policy iteration in a grid world.
6. Write a program to do reinforcement learning in a grid world.
7. Develop small AI based Mini Project like:
    i) Predicting user's next location
    ii) Detecting YouTube comment spam
    iii) Identifying the genre of a song
    iv) Shock front classification
8. Case Study on any one real time AI application.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Artificial Intelligence - A Modern Approach	Russell, S. and Norvig, P.	3rd edition, Prentice Hall.2015
2	Artificial Intelligence: Foundations of Computational Agents	Poole, D. and Mackworth, A.	Cambridge University Press.2010

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Artificial Intelligence, 3rd edition	Ric, E., Knight, K and Shankar, B.	Tata McGraw Hill.2009
2	Artificial Intelligence - Structures and Strategies for Complex Problem Solving	Luger, G.F.	6th edition, Pearson.2008
3	Knowledge Representation and Reasoning	Brachman, R. and Levesque, H.	Morgan Kaufmann. 2004
4	Artificial Intelligence with Python: A Comprehensive Guide to Building Intelligent Apps for Python Beginners and Developers	Prateek Joshi	Packt publication January 2017 Edition
5	Reinforcement Learning: An Introduction	Sutton R.S. and Barto, A.G.	MIT Press. 1998
6	Artificial Intelligence and Intelligent Systems	Padhy, N.P.	Oxford University Press. 2009

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5. Software Testing and Quality Assurance (PCE- CS704) Elective-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : 1 Hrs/Week	**Term work: 25 Marks**
Practical : --	**Practical : –**

Pre-requisites: Software Engineering, SDLC and STLC.

Course Objectives

1. To understand software testing and quality assurance as a fundamental component of software life cycle
2. To understand the fundamentals of software verification
3. To efficiently perform Testing & QA activities using modern software tools
4. To understand and compare testing web applications and desktop applications

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Understand fundamental component of software life cycle
2. Apply and use the modern software testing tools
3. Compare and analyze the web and desktop application testing
4. Explore newer software project assessment methods

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction :** Some Software Failures, Testing Process, Some Terminologies, Limitations of Testing, The V Shaped software life cycle model	4
2.	**Software Verification:** Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit **Creating test cases from SRS and Use cases:** Use Case Diagram and Use Cases, Generation of test cases from use cases, Guidelines for generating validity checks,	8

	strategies for data validity, Database testing	
3.	**Regression Testing:** What is regression testing?, Regression Test cases selection, Reducing the number of test cases, Risk analysis, Code coverage prioritization techniques Object oriented testing: What is Object orientation?, What is object oriented testing?, Path testing, State based testing, Class testing	7
4.	**Software Testing Tools:** Selecting and Installing Software Testing tools, Automation and Testing Tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools,	6
5.	**Testing Process :** Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.	5
6.	**Testing Web applications** What is web testing? functional testing, UI testing, Usability testing, configurations and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics. **Automated Test data generation:** Automated Test Data generation, Approaches to test data generation, Test data generation tools	6

Term Work

- Minimum of 10 Tutorials to be done from the list given below.
- It should include the demonstration and use of the Tools /Techniques

Guidelines for tutorials:

It should consist of 8-10 assignments based on the following topics:

1. Software Testing Process, its need and limitations

2. Verification at different phases of SDLC for particular case study (SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit etc.)

3. Creating test cases from SRS and Use cases for particular case study

4. Generation of validity checks for particular case study

5. Regression testing with Test cases selection / Regression testing with reducing the number of test cases / Regression testing with code coverage prioritization techniques

6. Generation of test cases using Path testing/ State based testing/Class testing for particular case Study

7. Measurement in Software Engineering

8. Software Metrics: Object oriented Metrics used in testing

9. Calculation of Software Quality attributes using different prediction models

10. Measurement of Internal / External Product Attributes

11. Generation of test cases in different key areas of Web application testing
12. Automated test data generation

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Software testing:	Yogesh Singh,	Cambridge University Press, First Edition	Unit-I,II,III,VI
2	Effective Methods for Software Testing (Chapter 4, 6, 7, 8, 9, 10)	William E. Perry,	Third edition, Wiley India, 2009	Unit –IV,V
3	Software Testing – Principles and Practices (Chapter 12)	Naresh Chauhan,	Oxford University Press, 2010	Unit –IV

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Foundations of Software testing:	Aditya P. Mathur,	Pearson, Second Edition
2	Software Testing:	Ron Patton,	Pearson (SAMS), Second Edition
3	Software Quality, Mordechai	Ben Menachem, Garry S. Marliss,	BS Publications

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6. Image Processing (PCE – CS704) Elective-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : 1 Hrs./Week	**Term work: 25 Marks**
Practical :	**Practical : –**

Pre-requisites:

Course Objectives

1. To learn the fundamental concepts of Digital Image Processing
2. To study basic image processing operations.
3. To cover the basic analytical methods which are widely used in image processing.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications.
2. Explore different techniques in image acquisition and color transformation
3. Understand how digital images are represented
4. Evaluate the mathematical principles of digital image enhancement
5. Explore and apply the concepts of Edge detection, segmentation and object recognition

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction** Concept of Digital Image Processing, Steps in Image Processing, Components of Image Processing System, Applications areas, Image representation, Grey scale and color images.	6
2.	**Image Enhancement and Processing :** Basic Grey level transformation, Histogram Processing techniques, Color Fundaments, color models, Pseudo color image processing.	7
3.	**Image Restoring and Reconstruction:** Noise models, Noise Reduction, Inverse filtering, MMSE filtering.	5
4.	**Image Compression :** Fundamental of Redundancies, Basic Compression Methods, Huffman coding, Arithmetic coding, LZW coding, JPEG	5

	compression, Standard.	
5.	**Image Segmentation:** Detection of Discontinuities, Point, Line and Edge detection, Thresholding, Region based Segmentation.	6
6.	**Image Processing Applications:** Biometric Pattern Recognition, Face Recognition. Preprocessing of Signature Patterns, Lung Disease Identification.	7

Term Work

- It should consist of minimum 8 – 10 assignments based on the above topics.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Digital Image Processing	R.C.Gonzalez and R.E.Woods	Pearson Edition	1 to 6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Digital Image Processing	A.K.Jain	PHL
2	Image processing, Analysis and Machine vision	M.Sonka, V.Hlavac, and R.Boyle	Thomson Asia pvt. Ltd

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7. WEB TECHNOLOGIES (PCC- CS705)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** NA
Tutorial :NA	**Term work: 50 Marks**
Practical : 4 Hrs./Week	**POE : 50 Marks**

Pre-requisites: Object oriented Programming, Basics of HTML and CSS.

Course Objectives

1. Introduce students with front end web designing.
2. Motivate the students to develop web applications using PHP.
3. To introduce emerging Web technology concepts and tools.
4. To learn database access technologies and state management techniques.
5. To expose students to XAMPP web services.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Apply knowledge of client side scripting.
2. Develop web application using PHP.
3. Design web application using MVC and Angular JS.
4. Demonstrate use of server side technologies.
5. Explore newer tools for web development.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Front End Web Designing HTML and CSS:** HTML Design Patterns: HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes, HTML Whitespaces CSS Selector and Inheritance: Type, Class and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance, and Bootstrap	6

	2.	**Javascript Basics:** Introduction to javascript, Basic program of javascript, variables, functions, conditions, loops and repetition, Function, Arrays – DOM, Built-in Objects, Regular Expression, Exceptions, Event handling In Javascript, Validating HTML form data using javascript, Validation- AJAX - JQuery	7
	3.	**Angular Node JS:** Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks, Forms implementation, Filters, Services, Consuming REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application. Node, NodeJsarchitecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Events, Listeners, Timers, and Callbacks in Node.js. Testing node application. Introduction to Mongo DB- Accessing MongoDB from Node.js.	5
	4.	**PHP basic:** PHP Basics: Embedding PHP code in Your Web Pages, Commenting Your Code, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking a Function, Creating a Function, Function Libraries Array: What is Array?, Creating an array, outputting an Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array, Functions.	5
	5.	**PHP session management (state management):** Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers, PHP cookies, Uploading Files with PHP	6
	6.	**PHP Database and small app using Laravel and Code to generate:** Installation Prerequisites, Using the MySqli Extension, Interacting with the Database, Executing Database Transactions.	7

Term Work

- Minimum of 15 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List

1. Create html pages for website like login, registration and about us pages.
2. Apply and design the created HTML pages using CSS
3. Write a program demonstrating javascript functions and different validations.
4. Write a program to read and write HTML contents with JQuery.

5. Create a simple Testing Angular application.
6. Write a program demonstrating NodeJs application.
7. Write a program to handle the error in NodeJs..
8. Write a study experiment for Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or Installation of XAMPP.
9. Hello world Program-Embedded HTML with PHP.
10. Program based on PHP variables, Expression, arrays, control structure.
11. Experiment Based on OOP and Advance OOP PHP
12. Form validation using PHP using regular expressions
13. Upload various types of file from client side to server with validation
14. Write a program to create and handle a session, cookie in PHP
15. Insert user entered data in form to MySQL database using PHP
16. Update user's data stored in MySQL database using PHP
17. Write a program to manage session in PHP having login facility in any web application
18. Write a program to show stored cookies, update, retrieve and delete from browser.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Pro HTML5 and CSS3 Design Patterns	Michael Bowers, DionysiosSynodinos and Victor Sumner	Apress edition	(Unit I & II)
2	Beginning PHP and MySQL: From Novice to Professional	W. Jason Gilmore	Fourth Edition	Unit IV to VI
3	MEAN Web Development	Amos Q. Haviv	PACKT PUBLISHING LTD	Unit III

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Pro HTML5 and CSS3 Design Patterns	Michael Bowers, DionysiosSynodinos and Victor Sumner	Apress edition
2	Web Development withNode and Express	Ethan Brown	Published by O'Reilly Media
3	http://www.php.net	**Open Source**	online

Final Year B. Tech (Computer Science and Engineering) Sem– VII

8. Project-I (PW- CS706)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : NA	**Theory :** NA
Tutorial : NA	**Term work: 50 Marks**
Practical : 4 Hrs./Week	**Demo & OE: 50 Marks**

Pre-requisites: Software Engineering, Mini Project.

Course Objectives

1. Identify the area of project work

2. Recognize the need and ability to engage in lifelong learning

3. Function effectively on teams and to communicate effectively

4. Able to prepare the technical report

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Explain the need of a software project for the society

2. Identify requirement analysis like functional and technical requirements for the project

3. Come up with design documents for the project consisting of Architecture, Dataflow diagram,

Class Diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams,

Database Design Documents, Sequence Diagram, Use Case Diagram

4. Able to demonstrate analysis and design.

5. Prepare the technical report consisting of Requirement specification, Analysis and Design of Project

Contents

The project work is to be carried out in two semesters of Final Year Computer Science and Engineering.

The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters.

In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the Name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report.

The term work assessment will be done jointly by teachers appointed by Head of the Institution.

The oral examination will be conducted by an internal and external examiner

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. **Care should be taken to avoid copying and outsourcing of the project work.**

Final Year B. Tech (Computer Science and Engineering) Sem- VII

9. Internship (SI-CS707)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : NA	**Practical:1 Credit**
Tutorial :NA	**Term work: 50 Marks**
Practical : Minimum4 Weeks duration	**Mode of Evaluation : –**Internship Report, Presentation and Project Review.

Pre-requisites: Completion of minimum of Six semesters**,** Knowledge of Basic Programming Languages, Database Software.

Course Objectives

The course is designed to expose the students to industry environment and to take up on-site assignment as trainees or interns.

Course Outcomes

At the end of this internship the student should be able to:
1. Have an exposure to industrial practices and to work in teams
2. Communicate effectively
3. Understand the impact of engineering solutions in a global, economic, environmental, and societal context
4. Develop the ability to engage in research and to involve in life-long learning
5. Comprehend contemporary issues
6. Engage in establishing his/her digital footprint

Duration: Minimum 4 Weeks
Details:
Four weeks of work at industry site.
Supervised by an expert at the industry.

Term Work

1. Mode of Evaluation: Internship Report, Presentation and Project Review.
2. Collect the Internship Completion Letter given by authorized industry.
3. Assess the work based on progress report (signed by industry expert).

Final Year B. Tech (Computer Science and Engineering)

Semester- VIII

1. Big Data Analytics (PCC - CS801)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :4 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work : 25 Marks**
Practical : 2 Hrs./Week	**POE : 50 Marks**

Pre-requisites: Operating Systems, Hadoop, Java, Networking, Machine Learning and Databases.

Course Objectives

1. Analyze several key technologies used in manipulating, storing, and analyzing big data.
2. Acquire clear understanding of R & Hadoop.
3. Acquire clear understanding of Integrating R & Hadoop and Acquire clear understanding of Hadoop Streaming and its importance.
4. Manage Big Data and analyze Big Data.
5. Apply tools and techniques to analyze Big Data.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Analyze several key technologies used in manipulating, storing, and analyzing big data.
2. Acquire clear understanding of R & Hadoop.
3. Acquire clear understanding of Integrating R & Hadoop and Acquire clear understanding of Hadoop Streaming and its importance.
4. Manage Big Data and analyze Big Data.
5. Apply tools and techniques to analyze Big Data.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**INTRODUCTION TO BIG DATA :** Big Data and its Importance – Four V's of Big Data – Drivers for Big Data –Introduction to Big Data Analytics – Big Data Analytics applications, Architecture Components, Massively Parallel Processing (MPP) Platforms, Unstructured Data Analytics and Reporting, Big Data and Single View of Customer/Product, Data Privacy Protection, Real-Time Adaptive Analytics and Decision Engines.	8
2.	**INTRODUCTION TO R &HADOOP :** Getting Ready to Use R and Hadoop, Installing R, Installing R Studio, Understanding the features of R language, Installing Hadoop, Understanding Hadoop features, Learning the HDFS and MapReduce architecture, Writing Hadoop MapReduce Programs, Introducing Hadoop MapReduce, Understanding the Hadoop MapReduce fundamentals, Writing a Hadoop MapReduce example, Learning the different ways to write Hadoop MapReduce in R, Hadoop Ecosystem, Hadoop YARN, Hbase, Hive, Pig and Pig latin, Sqoop, ZooKeeper, Flume, Oozie.	8
3.	**INTEGRATION OF R & HADOOP :** Integrating R and Hadoop, Introducing RHIPE, Understanding the architecture of RHIPE, Understanding RHIPE samples, Understanding the RHIPE function reference, Introducing RHadoop, Understanding the architecture of RHadoop, Understanding RHadoop examples, Understanding the RHadoop function reference. HADOOP STREAMING WITH R Using Hadoop Streaming with R - Introduction, Understanding the basics of Hadoop Streaming, Understanding how to run Hadoop streaming with R, Understanding a MapReduce application, Exploring the Hadoop Streaming R package.	8
4.	**DATA ANALYTICS WITH R AND HADOOP :** Understanding the data analytics project life cycle – Introduction, Identifying the problem, Designing data requirement, Preprocessing data, Performing analytics over data, Visualizing data, Understanding data analytics problems, Exploring web pages categorization Case Studies: Computing the frequency of stock market change, Predicting the sale price of blue book for bulldozers.	8

5.	**SPARK FOR BIG DATA ANALYTICS :** The advent of Spark, Limitations of Hadoop, Overcoming the limitations of Hadoop, Theoretical concepts in Spark: Resilient distributed datasets, Directed acyclic graphs, SparkContext, Spark DataFrames, Actions and transformations, Spark deployment options, Spark APIs, Core components in Spark: Spark Core, Spark SQL, Spark Streaming, GraphX, MLlib, The architecture of Spark	8
6.	**UNDERSTANDING BIG DATA ANALYSIS WITH MACHINE LEARNING :** Introduction to machine learning, Types of machine-learning algorithms, Supervised machine learning algorithms, Unsupervised machine learning algorithm, Recommendation algorithms, Steps to generate recommendations in R, Generating recommendations with R and Hadoop.	8

Term Work

- Minimum of 10-12 Experiments to be performed from the list given below.

Experiment List

1. Installation of Hadoop.
2. Building Hadoop MapReduce application for counting frequency of word/phrase in simple text file.
3. Study and demonstration of Hadoop YARN Administration command and User commands.
4. Configure Hive demonstrate following
    - Write and execute a Hive query
    - Define Hive External table
    - Define Partitioned Hive Table
5. Demonstrate following on Hive
    - Load data into Hive table from HDFS
    - Update row in Hive table
    - Delete row from a Hive Table
6. Working with operators in Pig - FOREACH, ASSERT, FILTER, GROUP, ORDERBY, DISTINCT, JOIN, LIMIT, SAMPLE, SPLIT,FLATTEN.
7. Write and execute a Pig script

- Load data into a Pig relation without a schema
- Load data into a Pig relation with a schema
- Load data from a Hive table into a Pig relation

8. Installation of R studio and demonstration of following
    - R basic Syntax.
    - Exploring basic R Data Types.
    - Drawing Pie chart, Bar Chart, Histogram, etc.
    - R array and Vector.
9. Working with R with data sets- create, read, write and R Tables- create, read, write.
10. Manipulating and processing data in R - merging datasets, sorting data, putting data into shape, managing data using matrices managing data using data frames.
11. Study of RHIPE (R and Hadoop Integrated Programming Environment)
    - Installing Hadoop.
    - Installing R.
    - Installing protocol buffers.
    - Setting up environment variables.
    - Installing rJava.
    - Installing RHIPE.
12. Identifying the frequency of all the words that are present in the provided input text files using RHIPE Environment.
13. Installation and configuration of Apache Spark on Local Machine.
14. Write an application to Read multiple text files into single RDD using Spark.
15. Implementation of Linear regression with R and Hadoop.
16. Case studies should consist of but not limited to following: Big Data Analytics in Healthcare, Big Data Analytics In Immunology: A Knowledge-Based Approach, Big Data Analytics Embedded Smart City Architecture For Performance Enhancement Through Real-Time Data Processing And Decision-Making.
17. Case Study How Data Science Helped in development COVID-19 Vaccine.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Big Data Analytics: Disruptive Technologies for Changing the Game	Arvind Sathi	IBM Corporation, 2012	Unit - I
2	Big Data Analytics with R and Hadoop	Vignesh Prajapati	Packt Publishing 2013	Unit - II, III, IV, VI
3	Practical Big Data Analytics	Nataraj Dasgupta	Packt Publishing 2018	Unit - V

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1.	Big Data (Black Book)	DT Editorial Services	Dreamtech Press
2.	Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business	Michael Minelli, Michehe Chambers	AmbigaDhiraj, Wiely CIO Series, 2013.
3.	Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics	Bill Franks	Wiley and SAS Business Series, 2012
4.	Hadoop: The Definitive Guide	Tom White	O'reilly, 2012
5.	Big Data Analytics	Seema Acharya, Subhasini Chellappan	Wiley, 2015
6.	Big Data Analytics with Hadoop 3	Sridhar Alla	Packt Publishing, 2018
7.	Big Data Analytics: Methods and Applications	Jovan Pehcevski	Arcler Press

Final Year B. Tech (Computer Science and Engineering) Sem – VIII

2. Deep Learning (PCC - CS802)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: 25 Marks**
Practical : NA	**Practical : NA**

Pre-requisites: Machine Learning**.**

Course Objectives

1. Understand the basic concepts of deep learning networks
2. Introduce different models of deep learning to work with various types of inputs.
3. Learn effects of different parameters and hyper-parameters on deep learning model output.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Describe basic concepts of artificial intelligence and deep learning.
2. Develop different deep learning models for given tasks.
3. Devise the correct parameters and hyper-parameters of developed model for getting improved results.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Neural Network and Deep Learning** Introduction to AI, ML and Deep Learning, A brief history, Need of Deep Learning, Basics of neural network, Data representation for neural network, Gradient based optimization, anatomy of neural network.	7
2.	**Introduction to Tensorflow, Keras and hyperparameters** **Tensorflow:** Introduction, Downloading and installation of Tensorflow, The computation graph, Modelling cyclic dependencies, Building and running visualization, Computing graph and distribution, Simple math operation and distribution, Tensors, Rank of tensors, Tensor math, Numpy and tensors, Tensorflow example, **Keras:** Introduction, Models, Layers, Pre-	7

	processing, Deep Learning case studies, **Hyperparameters:** Learning rate, No of iterations, hidden layers, hidden units, choice of activation function, momentum, mini batch size, Overfitting and underfitting, regularization	
3.	**Convolutional Neural Networks** The convolutional operation, The max pooling operation, Training a convnet from scratch on a small dataset, Using pre-trained convnet, Visualizing what convnet learn	6
4.	**Sequence Models** One hot encoding, Using word embeddings, A recurrent layer in Keras, Understanding the LSTM and GRU layers, Example of LSTM in Keras, Advanced use of Recurrent Neural Network	6
5.	**Advanced Deep Learning Best Practices** Going beyond the sequential model: The Keras functional API, Inspecting and monitoring deeplearning models using Keras callbacks and Tensor Board, Getting the most out of your models	5
6.	**Generative Deep Learning** Text generation with LSTM, Deep Dream, Neural Style Transfer, Generating images with variational auto encoders, Introduction to generative adversarial network.	5

Term Work

- Minimum of 10 Tutorials to be performed from the list given below.
- Practical should include the implementation and use of the following mechanisms/Algorithms/Tools /Techniques

Tutorial List

1. Installing of Anaconda or Miniconda and working with Tensorflow and Keras
2. Introduction and working with Google Colab for using GPUs and TPUs for large projects
3. Developing simple perceptron (single layer neural network)
4. Developing simple multilayer neural network for different tasks
5. Designing and developing basic CNN for given task
6. Using transfer learning in CNN
7. Designing and developing simple RNN for given task
8. Designing and developing RNN with LSTM for given task
9. Designing and developing RNN with GRU for given task
10. Designing and developing model for Text generation using LSTM
11. Designing and developing model for Neural style transfer
12. Designing and developing model for generating images

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Deep Learning with Python	Francois Chollet	

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Deep Learning	by Ian Good fellow, Yoshua Bengio, Aaron Courville	MIT Press Book

Final Year B. Tech (Computer Science and Engineering) Sem- VIII

3. PROJECT MANAGEMENT (PCE- CS803) Elective-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: 25 Marks**
Practical :	**Practical : –**

Pre-requisites: Software Engineering Concept, Operations Management

Course Objectives

1. Provide students with a basic understanding of project management principles and practices.
2. Demonstrate competency in the creation and management of a project plan
3. Understanding impact of Scope, Time and Cost management.
4. Understanding the software quality metrics and quality assurance.
5. Develop strategies to calculate risk factors involved in IT projects
6. Understand the Agile development practices and driving forces for taking an Agile approach to software development.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Understand project characteristics and various stages of a project.
2. Understand the conceptual clarity about project organization and feasibility analyses
3. Analyze the learning and understand techniques for Project planning, project risk, scheduling and Execution
4. Resolve IT related crises using project management
5. Manage the phases and infrastructure of IT projects
6. Describe fundamental concepts of agile methodology and agile development practices

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction to Project Management:** Project and Project Management (PM), Role of project Manager, System view of PM, Organization, Stakeholders, Project phases and lifecycle, Context of IT projects, process groups, mapping groups to Knowledge areas	5
2.	**Project Integration Management:** Strategic planning and project selection, Developing a Project Management Plan, Directing and Managing Project Work, Monitoring and Controlling Project Work, Performing Integrated Change Control, Closing Projects or Phases	5
3.	**Project Scope, Time and Cost management:** Planning Scope Management, Collecting Requirements, Defining Scope, Creating the Work Breakdown Structure, Validating Scope, Controlling Scope Planning Schedule Management, Defining Activities, Sequencing and Estimating Activity, Resources & Duration, Developing & Controlling Schedule Basic Principles of Cost Management, Planning Cost Management, Estimating Costs, Determining the Budget, Controlling Costs	9
4.	**Quality and Human Resource Management:** Importance, Planning Quality Management, Performing Quality Assurance, Controlling Quality, Tools and Techniques for Quality Control, **Human Resource management:** Importance, keys to managing people, human resource planning, acquiring, developing and managing project team.	6
5.	**Risk management:** Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control.	5
6.	**Agile Project Management:** The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects	4

Term Work

- It should consist of minimum 8 – 10 assignments based on the above topics.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Information Technology Project Management	Kathy Schwalbe	Cengage Learning 7E	(Unit I to V)
2	Software Project Management	Bob Huges, Mike Cotterell, Rajib Mall	McGraw Hill Edu	Unit -VI

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Effective Project Management	Robert K.Wysocki	Wiley India 7 Edition
2	Project Management Core Textbook	Mantel Jr., Meredith, Shafer, Sutton, Gopalan	Wiley India Edition
3	IT Project Management	Joseph Phillips 3E	McGraw Hill Edu.

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4. Natural Language Processing (PCE- CS803) Elective-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: - 25 Marks**
Practical : NA	**Practical : – NA**

Course Objectives

1. To introduces the fundamental concepts and techniques of natural language processing (NLP).
2. To gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
3. To examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Acquire the knowledge of fundamental mathematical models and algorithms in the fields of NLP
2. Apply these mathematical models and algorithms in application in software design and implementation for NLP.
3. Apply deep learning models to solve machine translation and conversation problems.
4. Apply deep structured semantic models on information retrieval and natural language applications.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction** Introduction to various levels of natural language processing, Ambiguities and computational challenges in processing various natural languages. Introduction to Real life applications of NLP such as spell and grammar checkers, information extraction, question answering, and machine translation.	6

2.	**Language Models** : The role of language models. Simple N-gram models. Estimating parameters and smoothing. Evaluating language models	6
3.	**Part Of Speech Tagging and Sequence Labeling**: Stochastic POS tagging, HMM, Transformation based tagging (TBL), Handling of unknown words, named entities, multi word expressions.	6
4.	**Syntactic parsing**: Constituency, Context-Free Grammars, Some Grammar Rules for English, Treebanks, Grammar Equivalence and Normal Form, Lexicalized Grammars.	6
5.	**Semantic Analysis**: Lexical semantics and word-sense disambiguation. Compositional semantics. Semantic Role Labeling and Semantic Parsing.	6
6.	**APPLICATIONSOFNLP:** NLInterfaces,TextSummarization,SentimentAnalysis,MachineTranslation,Questionanswering, Recent Trends in NLP	6

Term Work

- It should consist of minimum 8-10 assignments with emphasis on solving exercise problems.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Speech and Language Processing	Daniel Jurafsky and James H Martin	2E, Pearson Education, 2009

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	**Natural language Understanding**	James A..	**2e, Pearson Education,1994**
2	Natural language processing: a Paninian perspective,	Bharati A., Sangat R., Chaitanya V..	**PHI, 2000**

Final Year B. Tech (Computer Science and Engineering) Sem- VIII

5. Ad-Hoc Wireless Sensor Networks (PCE- CS803) Elective-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: 25 Marks**
Practical :	**Practical : NA**

Pre-requisites: Computer Network, Information Security, Modular Arithmetic & Number Theory, C / C++.

Course Objectives

1) To introduce cellular and Ad Hoc wireless networks

2) To introduce routing protocols in Ad Hoc wireless networks

3) To introduce Transport layer and security protocols for ad hoc wireless networks

4) To introduce sensor networks and its routing algorithms

5) To introduce sensor networks infrastructure and sensor tasking

Course Outcomes

On completion of the course, student will be able to-

1) Describe issues and design goals in Ad Hoc wireless networks

2) Explain and classify various routing protocols in Ad Hoc wireless networks

3) Describe design issues and classify transport layer protocols and security protocols in Ad Hoc wireless Networks

4) Describe challenges and routing protocols in sensor networks

5) Explain sensor networks infrastructure management and sensor tasking and control techniques

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction** Cellular and Ad Hoc wireless networks, Applications, Issues in Ad Hoc wireless networks, MAC Protocols for ad hoc wireless networks – Introduction, Issues in designing MAC protocol, Design goals of MAC protocol, Classification of	**6**

	MAC protocols, Contention based protocols.	
2.	**Routing protocols for ad hoc wireless networks** Introduction, Issues in designing a routing protocol for ad hoc wireless networks, Classification of routing protocols, Table driven, on-demand Hybrid routing protocols, Issues in designing a multicast routing protocol, Operation of multicast routing protocols, An architecture reference model for multicast routing protocols, Classification of multicast routing protocols.	**7**
3.	**Transport layer and security protocols for ad hoc wireless networks** Introduction, Design issues and goals, Classification of transport layer solutions, TCP over ad hoc wireless Networks, Security in ad hoc wireless networks, Network security requirements, Issues and challenges in security provisioning, Network security attacks, Key management, Secure routing.	**6**
4.	**Introduction to Sensor Networks** Unique Constraints and Challenges, Advantages of Sensor Networks, Sensor Network Applications, Medium Access Control, The S-MAC Protocol, IEEE 802.15.Standard and ZigBee: General Issues.	**6**
5.	**Routing Protocol for Sensor Network** Geographic, Energy-Aware Routing , Unicast Geographic Routing , Routing on a Curve , Energy-Minimizing Broadcast , Energy-Aware Routing to a Region , Attribute-Based Routing , Directed Diffusion , Rumor Routing , Geographic Hash Tables	**6**
6.	**Sensor Network Infrastructure Establishment** Topology Control , Clustering , Time Synchronization , Clocks and Communication Delays, Interval Methods, Reference Broadcasts, Localization and Localization Services, Ranging Techniques , Range-Based Localization Algorithms, Other Localization Algorithms, Location Services.	**7**

Term Work

Term work includes combination of written assignments, getting acquainted with wireless simulation tools and performing experiments from Virtual Lab portal of IIT, Bombay.
1) One assignment from each unit (Total 6 written assignments)

2) Faculty should demonstrate any open source wireless network simulator tool (ns-2, ns-3, GNS3, etc.) with installation, configuration and demonstration of some scenarios of WSNs.

3) Virtual Lab :- Performing 4 Assignments from Wireless Sensor Network Remote Triggered Lab (Wireless Remote Sensing, Experimentation, Monitoring and Administration Lab) from IIT Bombay

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Ad Hoc wireless Networks– Architecture and Protocols	C.S.R.Murthy& B.S. Manoj	Pearson Education	(Unit I to III)
2	Wireless sensor networks	Feng Zhao and LeonidesGuibas	Elsevier publication - 2004	(Unit –IV to VI)

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Ad Hoc Wireless Networks- A communication Theoretic perspective	O.K.Tonguz & G.Ferrari,	Wiley India
2	Ad Hoc Networking	Charles E. Perkins	Pearson Education
3	Ad Hoc Mobile Wireless Networks – Protocols and Systems	C. K. Toh	Pearson Education
4	Wireless Communications and Networks	William Stallings	Pearson Education – 2004
5	Introduction to Wireless and Mobile Systems, 2nd Edition,	Dharma Prakash Agrawal & Qing-An Zeng	CENGAGE Learning

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6. High Performance Computing (PCE- CS804) Elective-III

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week **Tutorial :** 1 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Term Work: 25 Marks	**Practical:** -

Pre-requisites: 1. Computer Organization 2. Computer Algorithms

Course Objectives

1. To introduce the current trends in computer architecture and programming model.
2. To understand Parallel Hardware and Parallel Software.
3. To learn Distributed-Memory Programming with MPI.
4. To learn Shared-Memory Programming with Pthreads.
5. To learn Shared-Memory Programming with OpenMP.
6. To solve basic parallel problems.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. To introduce the current trends in computer architecture and programming model.
2. To explain Parallel Hardware and Parallel Software.
3. To apply and use Distributed-Memory Programming with MPI.
4. To apply and use Shared-Memory Programming with Pthreads.
5. To apply and use Shared-Memory Programming with OpenMP.
6. Program parallel architectures.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction** Need of Ever-Increasing Performance, Building Parallel Systems, Need to Write Parallel Programs, Concurrent, Parallel, Distributed, Typographical Conventions, Cluster Computing - architecture, Classifications, Grid Computing - Architecture, Applications	**6**
2.	**Parallel Hardware and Parallel Software** Modifications to the von Neumann Model, Parallel Software, Input and Output, Performance, Parallel Program Design, Writing and Running Parallel Programs	**5**
3.	**Distributed-Memory Programming with MPI** Compilation and execution, MPI programs, SPMD programs, The Trapezoidal Rule in MPI, Dealing with I/O, Tree-structured communication, MPI Reduce, Collective vs. point-to-point communications, MPI Allreduce, Broadcast, Data distributions, MPI Derived Datatypes, Performance Evaluation of MPI Programs	**6**
4.	**Shared-Memory Programming with Pthreads** Processes, Threads, and Pthreads, Hello World, Matrix-Vector Multiplication, Critical Sections, Busy-Waiting, Mutexes, Producer-Consumer Synchronization and Semaphores, Barriers and Condition Variables	**6**
5.	**Shared-Memory Programming with OpenMP** Compiling and running OpenMP programs, The program, The Trapezoidal Rule, Scope of Variables, The Reduction Clause, The parallel forDirective, More About Loops in OpenMP: Sorting, Scheduling Loops	**6**
6.	**Parallel Program Development** Two *n*-Body Solvers, Recursive depth-first search, Nonrecursive depth-first search, Data structures for the serial implementations, Performance of the serial implementations, Parallelizing tree search, A static parallelization of tree search using Pthreads, A dynamic parallelization of tree search using Pthreads, Evaluating the pthreads tree-search programs	**7**

Term Work

- Term Work should consist of 10 assignments based on the following list. At least one assignment must be from each unit.

1. Write a short note on significance of parallel programming to enrich the computational performance.
2. Enumerate the fundamental prerequisites of parallel programming.
3. Explain the modified architecture of von Neumann model.
4. Describe parallel program design with running process.
5. Explain the Trapezoidal rule in MPI.
6. How the evaluation for performance of MPI is done?
7. What is Pthread? Write a note on Pthread creation, finish. Explain Pthread API.
8. Explain: a) Mutexes b) barriers c) busy waiting
9. Explain the following terms with respect to OpenMp
    a. The trapezoidal rule
    b. Scope of the variable
10. Explain various loops in OpenMp with example.
11. Write short note on two n-body solvers.
12. Write dawn Difference between Recursive depth - first search and Non Recursive depth - first search

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	An Introduction to Parallel Programming	Peter S. Pacheco	Elsevier, 2011	1 to 6
2	Introduction to Grid Computing	Bart Jacob, Michael Brown, Kentaro Fukui, NiharTrivedi	International Business Machines Corporation 2005.	Grid Computing Unit 1
3	High Performance Cluster Computing: Architectures and Systems, Volume 1	R. Buyya	Pearson Education, 2008	Cluster Computing Unit 1

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Parallel computing theory and practice	Michel J. Quinn	TMH
2	Computer Architecture & Parallel Processing	Kai Hwang & Briggs	McGraw Hill
3	Parallel and Distributed Systems	Arun Kulkarni, Napur Prasad Giri	Wiley Publications, 2nd Edition

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7. Block chain Technology (PCE- CS804) Elective-III

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : 1 hr/Week	**Term work: 25 Marks**
Practical :	**Practical :**

Pre-requisites: Expertise In Programming, Basic Knowledge Of Computer Security, Cryptography, Networking, Concurrent Or Parallel Programming

Course Objectives

1) Understand how blockchain systems (mainly Bitcoin and Ethereum) work
2) To securely interact with bitcoin and ethereum
3) Design, build, and deploy smart contracts and distributed applications
4) Integrate ideas from blockchain technology into their own projects

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Explain design principles of Bitcoin and Ethereum.
2. Explain Nakamoto consensus.
3. Explain the Simplified Payment Verification protocol.
4. List and describe differences between proof-of-work and proof-of-stake consensus.
5. Interact with a blockchain system by sending and reading transactions.
6. Design, build, and deploy a distributed application.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction** Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.	6
2.	**Blockchain** Introduction, Advantage over conventional distributed database, Blockchain Network, MiningMechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee,Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Privateand Public blockchain	7
3.	**Distributed Consensus**: Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, SybilAttack, Energy utilization and alternate.	6
4.	**Cryptocurrency**: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum -Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin	8
5.	**Cryptocurrency Regulation**: Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market andGlobal Economy.	8
6.	**Cryptocurrency Applications:** Internet of Things, Medical Record Management System, Domain Name Serviceand future of Blockchain	5

Term Work

Tutorials: Naive Blockchain construction, Memory Hard algorithm – Hashcash implementation, Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction,Toy application using Blockchain, Mining puzzles

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder,	Princeton University Press (July 19, 2016).	

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	'Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press, 2019.
2	Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform, 201

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8. Human Computer Interaction (PCE- CS804) Elective-III

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work: 25 Marks**
Practical : --	**Practical : --**

Pre-requisites: Web Technologies, Software Engineering, Basic knowledge of designing tools and languages like HTML, Java etc.

Course Objectives

1. To learn Human Computer Interaction study.
2. To learn human computer interface design
3. To learn Screen designing techniques
4. To learn Windows based UI interfaces
5. To learn Design and Development of Mobile Applications.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Explain principles of User Interface
2. Demonstrates HCI design process
3. Demonstrate screen designing techniques
4. Apply windows based UI interfaces
6. Design and Develop Mobile Applications

Unit No.	Unit Name and Details	No. of Lectures
1	**Importance of user Interface** Definition, Importance of good design - Benefits of good design. A brief history of Screen design, The graphical user interface popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user - Interface popularity, characteristics- Principles of user interface.	6

2	**Understanding Clients and Business Functions** Human interaction with computers Importance of human characteristics Human consideration Human Interaction speeds Understanding business Functions.	6
3	***I*nterface and Screen Design** Screen and Web Page Meaning and Purpose Organizing Elements Clearly and Meaningfully Ordering of Data and Content, Navigation and Flow Visually Pleasing Composition, Focus and Emphasis Presenting Information Simply and Meaningfully Technological Considerations in Interface Design – Graphical Systems and Web Systems	8
4	**Windows** Windows Characteristics Components of Windows Window Presentation Styles Types of Windows Organizing Windows Functions The Web and the Browser	6
5	**Mobile Applications and Information Architecture** Mobile application medium types – SMS, Mobile Websites, Mobile Web Widgets, Mobile Web Applications, Native Applications, Games, Mobile Application Media Matrix, Application Context, Utility Context, Locale Context, Informative Applications, Productivity Application Context, Immersive Full-Screen Applications, Application Context Matrix Information Architecture Introduction, Mobile Information Architecture.	6
6	**Mobile Design and Communication** Elements of Mobile Design, Mobile Design Tools, Designing for the Right Device, Designing for Different Screen Sizes. Mobile Web Development – Web Standards, Designing for Multiple Mobile Browsers, Device Plans, Mark-up, CSS, JavaScript	4

Term Work

Term Work should consist of 8-10 assignments based on topics of syllabus.
Students should Design two Interactive UI, one for Desktop Application and One for Mobile Application, using any of the software tool like HTML, CSS, java etc.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
01	The essential guide to user interface design	Wilbert O Galitz	2nd Edition; Wiley DreamTech, 2002.	1,2,3,4
02	Mobile Design and Development	Brian Fling	O'Reilly,	5,6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
01	Human - Computer Interaction	Alan Dix	3rd Edition; Pearson Education, 2003
02	Designing the user interface	Ben Shneidermann	3rd Edition; Pearson Education, 2009.
03	Interaction Design	Prece, Rogers and Sharps	3rd Edition; Wiley DreamTech, 2011.
04	User Interface Design	SorenLauesen	Pearson Education, 2005
05	Human -Computer Interaction	D. R. Olsen	1st Edition; Cengage Learning, 2009

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9. Mobile application development (PCC- CS805)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs./Week	**Theory :**
Tutorial :	**Term work: 50 Marks**
Practical : 4 Hrs./Week	**POE : 50 Marks**

Pre-requisites: Java and XML.

Course Objectives

1. To describe android architecture and the tools for developing android applications.
2. To create an android application.
3. To design the user interfaces used in android applications
4. To deploy android application on app market.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. To Install and configure Android application development tools.
2. To Design and develop user Interfaces for the Android platform.
3. To Design and develop database based android application.
4. To Apply Java programming concepts to Android app development

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Android Overview:** Overview of Android, History, Android Versions, Android OS stack: Linux kernel, Native Libraries/DVM, Application Framework, Applications, Activity, Activity lifecycle, Fragments, Activity Back Stack, Process and Threads. **Android Development Environment** Introduction to Android SDK, Android Emulator, Creating a Project, Project Directory Structure, DDMS, Logging in Android (Logcat), Android Manifest File, Permissions.	8
2.	**Intents and Layouts:** XML, Android View Hierarchies, Linear Layouts, Relative Layout, Table Layout, Frame Layout Sliding, Using Padding and Margins with Layouts. What Is Intent? Android Intent Messaging via Intent Objects, Types of Intents, Using Intents with Activities, Sending Intents (Telephony, SMS), Broadcast Receivers	4
3.	**Input Controls, Input Events, Dialogs:** Buttons, Text Fields, Checkboxes, Radio Buttons, Toggle Buttons, Spinners, Event Listeners, Event Handlers, Touch Mode, Handling Focus, Dialogs: Alerts, Popups, Toasts	4
4.	**Menus, Notification and ActionBar:** Menus, Options menu, Context menu, Popup menu, Handling menu click events, creating a Notification, Notification actions, Notification priority, Managing Notifications, Removing notifications.	4
5.	**Android Database and App Market:** Installing SQLite plugin, DbHelper, The Database Schema and Its Creation, Four Major Operations, Cursors, Example, publish app to the Android Market.	4
6.	**Using Common Android APIs**: Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs.	4

Term Work

- Minimum of 15 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List

01. Installation of Android SDK, emulator.
02. Creating simple project and study of android project structure and installing apk on mobile device/tablet, configuring mobile device/tablet in Android Studio with developer option and running app directly on mobile device/tablet.
03. Write a program to use of different layouts.
04. Write a program to study Intents for switching between activities.
05. Write a program to use of Intents for SMS and Telephony.
06. Write a program to study and demonstrate Broadcast Receiver.
07. Program to demonstrate Buttons, Text Fields, Checkboxes, Radio Buttons, and Toggle Buttons with their events handler.
08. Program to demonstrate Spinners, Touch Mode, Alerts, Popups, and Toasts with their events handler.
09. Program to demonstrate Touch Mode, Menus with their events handler.
10. Program to demonstrate notification with their action.
11. Develop a native calculator application.
12. Implement an application that writes data to the SD card.
13. Write a mobile application that creates alarm clock.
14. Implement an application that implements Multi-threading
15. Write a program to study and use of SQLite database.
16. Study of publishing app to the Android Market.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Beginning Android application development by	Wei-Mag Lee	

2	Learning Android by Marko Gargenta Publisher	W. Jason Gilmore	O'Reilly Media
3	Android Apps for Absolute Beginners	Wallace Jackson	SECOND EDITION
4	T1., "Android Wireless Application Development"	Lauren Darcey and Shane Conder	Pearson Education,2nd ed.

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Application Development	Reto Meier	Wiley India
2	Android in Action	W.FrankAbleson, RobiSen, Chris King, C. Enrique Ortiz	Third Edition
3	The Android Developer's Cook book "Building Applications with the Android SDK"	James Steele	
4	Beginning Android	Mark L Murphy	Wiley India Pvt Ltd
5	Android Application Development All in one for Dummies	Barry Burd	Edition: I

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10. Project-II (PW- CS806)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : NA	**Theory** : NA
Tutorial : NA	**Term work: 50 Marks**
Practical : 4 Hrs./Week	**Demo & OE : 50 Marks**

Pre-requisites: Project - I.

Course Objectives

1. Students should learn to design and develop usable User Interface
2. Students should learn to analyze and apply emerging technologies in development of a project
3. Students should learn to test the modules in Project
4. Students should learn to demonstrate working of project

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Design and develop usable User Interface
2. Analyze and apply emerging technologies in development of a project
3. Test the modules in Project
4. Demonstrate working of project

Contents

The group will continue to work on the project selected during the semester VII and submit the completed

Project work to the department at the end of semester VIII as mentioned below.

1. The workable project.
2. The project report in the bound journal complete in all respect with the following : -
    i. Problem specifications
    ii. System definition – requirement analysis.
    iii. System design – dataflow diagrams, database design
    iv. System implementation – algorithm, code documentation
    v. Test results and test report.
    vi. In case of object oriented approach – appropriate process be followed.

CIE will be jointly assessed by a panel of teachers appointed by head of the Institution. SEE examination will

be conducted by internal and external examiners

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. **Care should be taken to avoid copying and outsourcing of the project work**

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11. Professional Skills (HM-CS807)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :NA	**Theory :**NA
Tutorial :1 Hr. /Week (1 Credit)	**Term work: 50 Marks**
Practical :NA	**Mode of Evaluation: Based on Term Work Activities.**

Pre-requisites: Effective English Communication, Report Writing Skills, Technical Skills.

Course Objectives

1. To increase one's knowledge and awareness of emotional competency and emotional intelligence at place of study/work.
2. To develop interpersonal skills and adopt good leadership behavior for empowerment of self and others.
3. To set appropriate goals, manage stress and time effectively.

Course Outcomes

At the end of the program learners will be able to:
1. Recognize own strengths and opportunities.
2. Apply the life skills to different situations.
3. Speak fluently in academic and social contexts.
4. Develop Critical thinking and innovative skills.

Syllabus

I. E-Learning Course

Students are supposed to complete e-learning course from any online platforms like MOOCS/NPTEL/Swayam/Coursera/Udemy etc. related to Project work or advanced technologies.
Duration of the Course should be minimum 4 weeks.
At the end of course students are advised to attend the exam and get the certificate for the same.

II. Professional Skills: Career Skills

1. Resume Skills
2. Interview Skills / Online Interview

3. Group Discussion Skills
4. Exploring Career Opportunities

III. Professional Skills: Team Skills

1. Presentation Skills
2. Trust and Collaboration
3. Brainstorming
4. Social and Cultural Etiquettes
5. Internal Communication
6. Social Media Profile Building

IV. Leadership and Management Skills

1. Leadership Skills
2. Managerial Skills
3. Time Management
4. Entrepreneurial Skills
5. Innovative Leadership and Design Thinking
6. Ethics and Integrity

V. Introduction to Critical Life skills

Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation; Understanding Life Skills: Movie based learning, Self-awareness- identity, body awareness, stress management; building self-confidence; Importance of listening skills, Difference between listening and hearing, Types of listening.

Term Work

1. Students are expected to learn new application areas, enhance technical skills, and build their profile by completing E-Learning Course.
2. Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax.
3. Participate in a simulated interview.
4. Actively participate in group discussions towards gainful employment.
5. Capture a self - interview simulation video regarding the job role concerned.
6. Enlist the common errors generally made by candidates in an interview.
7. Perform appropriately and effectively in group discussions.
8. Explore sources (online/offline) of career opportunities.
9. Identify career opportunities in consideration of their own potential and aspirations.
10. Use the necessary components required to prepare for a career in an identified occupation (As a case study).

Based on above activities respective guide should assess the performance of the students out of 50 marks.

Learning Resources

Text Books

1. Lewis Lansford and Peter Astley. Oxford English for Careers: Engineering 1: Student's Book. 2013. USA: Oxford University Press.
2. Jaimie Scanlon. Q: Skills for Success 1 Listening & Speaking. 2015. [Second Revised Edition]. Oxford: Oxford University Press.

Reference Books:

1. Sanjay Kumar and Puspalata. Communication Skills. 2015. [Second Edition] Print. New Delhi: Oxford University Press.
2. John Seely. Oxford Guide to Effective Writing and Speaking. 2013. [Third Edition].New Delhi: Oxford University Press.
3. Meenakshi Raman. Communication Skills. 2011. [Second Edition]. New Delhi: Oxford University Press.
4. Terry O‟Brien. Effective Speaking Skills. 2011. New Delhi: Rupa Publishers.
5. BarunMitra. Effective Technical Communication: AGuide for Scientists and Engineers. 2015. New Delhi: Oxford University Press.
6. English vocabulary in use – Alan Mc‘carthy and O‘dell
7. APAART: Speak Well 1 (English Language and Communication)
8. APAART: Speak Well 2 (Soft Skills)
9. Business Communication – Dr.Saroj Hiremath

Web References:

1 Train your mind to perform under pressure- Simon sinek
https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-underpressure-capture-your-flag/
2 Brilliant way one CEO rallied his team in the middle of layoffs
https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-beforenumbers.html
3 Will Smith's Top Ten rules for success
https://www.youtube.com/watch?v=bBsT9omTeh0

Online Resources:

1 https://www.coursera.org/learn/learning-how-to-learn
2 https://www.coursera.org/specializations/effective-business-communication